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REGIONAL TRANSPORTATION PLAN FOR THE PIONEER VALLEY - 2000 UPDATE

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2000 Update

to the

Pioneer Valley Regional Transportation Plan

Draft Report - November, 2000

Prepared by the

Pioneer Valley Planning Commission

Comments on this Draft document are encouraged and may be submitted to:

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The comment deadline is Thursday, November 30, 2000

This document was developed with the assistance of the Federal Highway Administration, Federal Transit Administration, the Massachusetts Executive Office of Transportation and Construction, the Massachusetts Highway Department, and the Pioneer Valley Transit Authority.

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CHAPTER 1

2000 UPDATE TO THE PIONEER VALLEY REGIONAL TRANSPORTATION PLAN

The Pioneer Valley Regional Transportation Plan (RTP) outlines the direction of transportation planning and improvements for the Pioneer Valley through the year 2025. It provides the basis for the Transportation Improvement Program (TIP) as well as state and federal funding for regional transportation planning and projects. This document is an update to the current RTP (last published in 1997) and must be endorsed by the Pioneer Valley Metropolitan Planning Organization (MPO, described in Chapter 2).

The long range plan concentrates on future deficiencies in our transportation infrastructure, presents the preferred strategies to alleviate those deficiencies, and in concert with regional goals and objectives and the Transportation Equity Act for the 21st Century (TEA-21) legislation, creates a schedule of regionally significant projects that are financially constrained.

Although the RTP focuses on transportation it is a comprehensive planning document. The Pioneer Valley has taken great strides in coordinating the RTP development process with other non-transportation planning efforts in the region. The Pioneer Valley Plan for Progress, published in 1994, presents a strong case for improving our transportation infrastructure to encourage growth and economic development. The plan also recognizes that the region's cities and towns are experiencing changes which will affect its people, landscape, economy, and governmental institutions for decades. This change includes a shift in the regional economy from primarily manufacturing to service based. Changes in land use and development patterns are transforming the traditional visual character and function of the region and there is an increased awareness of the role transportation plays in influencing regional growth and change.

Several elements of strategic planning must be emphasized. First, strategic planning is a continuing process that not only produces planning documents, but an action agenda from which local decision-makers can work. Second, strategic planning is contingent upon the critically important input of the local chief elected officials, city and town staff, and the general public, a point of emphasis for this RTP update. Third, the strategic planning process is based on a realistic assessment of external forces--political, social, economic, and technological--that can affect Pioneer Valley communities and residents. Finally, actions that come from the strategic planning process must have a real potential for implementation.

By developing the RTP in such a manner, the region will be able to conduct twenty-five years of successful transportation improvement programming through the year 2025.

CHAPTER 2

TRANSPORTATION PLANNING PROCESS

A. REQUIREMENTS

1. Transportation Equity Act for the 21st Century(TEA-21)

a) Transportation Equity Act for the 21st Century

On June 9, 1998, the President signed into law PL 105-178, the Transportation Equity Act for the 21st Century (TEA-21) authorizing highway, highway safety, transit and other surface transportation programs for the next 6 years. TEA-21 builds on the initiatives established in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), which was the last major authorizing legislation for surface transportation. This new Act combines the continuation and improvement of current programs with new initiatives to meet the challenges of improving safety as traffic continues to increase at record levels, protecting and enhancing communities and the natural environment as we provide transportation, and advancing America's economic growth and competitiveness domestically and internationally through efficient and flexible transportation.

Significant features of TEA 21 include:

- Assurance of a guaranteed level of Federal funds for surface transportation through FY 2003. The annual floor for highway funding is keyed to receipts of the Highway Account of the Highway Trust Fund (HTF). Transit funding is guaranteed at a selected fixed amount. All highway user taxes are extended at the same rates as when the legislation was enacted.

- Extension of the Disadvantaged Business Enterprises (DBE) program, providing a flexible national 10 percent goal for the participation of disadvantaged business enterprises, including small firms owned and controlled by women and minorities, in highway and transit contracting undertaken with Federal funding.

- Strengthening safety programs across the Department of Transportation (DOT). New incentive programs, with great potential for savings to life and property, are aimed at increasing the use of safety belts and promoting the enactment and enforcement of 0.08 percent blood alcohol concentration standards for drunk driving. These new incentive funds also offer added flexibility to States since the grants can be used for any Title 23 U.S.C. activity.

- Investing in research and its application to maximize the performance of the transportation system. Special emphasis is placed on deployment of Intelligent Transportation Systems to help improve operations and management of transportation systems and vehicle safety.

- Continuation of the proven and effective program structure established for highways and transit under the landmark ISTEA legislation. Flexibility in the use of funds, emphasis on measures to improve the environment, focus on a strong planning process as the foundation

of good transportation decisions-all ISTEA hallmarks-are continued and enhanced by TEA 21.

- Consolidating the 16 factors from ISTEA into the 7 general issue areas that were originally included in the Administrative NEXTEA proposal. None of the new factors explicitly requires coordination of Transportation and Land Use. Only issues that involve "quality of life" should include such coordination.

- The 7 issue areas "shall be considered", however, a failure to consider any specific factor in formulating plans, projects, programs, strategies and certification processes is not reviewable in court.

- The expansion or designation of existing or new MPO boundaries due to the imposition of any new air quality standards will not automatically occur. Changes in MPO boundaries will be determined by an agreement between the Governor and the affected local governments.

- The states are given flexibility to move projects within a three year Transportation Improvement Program without separate approval or action by the USDOT, provided the MPO concurs.

- Freight shippers, providers of freight transportation services, and representatives of users of public transit are added to the list of persons and groups to be given opportunity to comment on long-range plans and TIPs.

- The states and MPOs can include an illustrative list of projects that would have been included in the plan or TIP if additional resources were to become available. This provision, however, was not intended to affect, in any way, the fiscal constraint requirements or conformity requirements of the plan or TIP.

- The state or MPO may select projects for implementation from the list of "illustrative" projects, but the approval of the secretary of the USDOT is required and conformity would subsequently have to be determined.

- Bicycle and pedestrian projects must be given special consideration in developing the plan and TIP.

- The states and MPOs must cooperatively develop estimates of funds available to support plan implementation.

- USDOT must encourage each MPO to coordinate in the design and delivery of transportation services with governmental agencies and non-profit organizations that receive federal assistance from other than USDOT.

- TEA 21 creates a $750 million Access to Jobs Program and a Reverse Commute Program which was not provided for under ISTEA. Of the total, $10 million per year is for the Reverse Commute Program. The Access to Jobs component is funded by a combination of Highway Trust Funds and General Funds. The Access to Jobs Program provides competitive grants to local governmental entities and non-profit organizations to develop transportation services to connect welfare recipients and low income persons to employment and needed support services. Among the criteria (but not limited to these) for grant awards are coordination with and the use of existing transportation providers, coordination with state welfare agencies, the presence of a regional plan and long term financing strategies, and consultation with the community to be served. Projects must be

part of a coordinated public transit/human service planning process and must be coordinated with and approved by affected transit operators. In areas over 200,000 population, grant applications are selected by the chief executive officer of the state.

- TEA 21 also establishes two programs totaling $700 million to support trade and improve security at borders, and to design and construct corridors of national significance. Under the Trade Corridor program, states and MPOs are eligible for allocations from USDOT to fund feasibility studies, comprehensive corridor planning and design, location and routing studies, multi-state and interstate coordination, and environmental review and construction. Under the Border Crossing Program, states and MPOs are eligible for allocations from USDOT to fund improvements to existing or new transportation and supporting infrastructure, operational improvements, modifications to regulatory procedures, international coordination, and activities of federal inspection agencies.

2. Clean Air Act Amendments of 1990

As a result of federal Clean Air legislation, the Regional Transportation Plan must include a complete analysis of air quality issues in the region, along with demonstrations of how this plan will work to achieve National Ambient Air Quality standards. Further, it must include regional short and long range transportation plans and projects indicating the future direction of the transportation system. The degree to which the short and long range plans are discussed is essentially the option of the organization(s) preparing the plan. It is important to note, however, that it is necessary for transportation projects/plans to be included in a Regional Transportation Plan, if they are to receive federal funding for implementation.

B. PARTICIPANTS IN THE TRANSPORTATION PLANNING PROCESS

A variety of public and private entities are involved in the Transportation Planning Process. A summary of these organizations and their responsibilities follows.

1. Member Communities

The Pioneer Valley Region consists of 43 incorporated cities and towns. Each has a large responsibility to provide local transportation facilities and services. As a result, a significant portion of each local budget is expended for transportation purposes. Communities also receive state funds, called Chapter 90, for transportation purposes. Some of these local responsibilities and/or expenditures include:

- Initiation of federally assisted projects for roadways not under state jurisdiction;
- Support for public transit by more than half of the region's 43 municipalities that are members of the Pioneer Valley Transit Authority (PVTA);
- Contribution by some rural municipalities to special, local paratransit services in their towns; and,
- Provision of school transportation, public service vehicles (such as police, fire and, in some areas, trash removal), local traffic regulation, and road and sidewalk maintenance by all municipalities in the Pioneer Valley Region.
- Seasonal maintenance of local roadways (snow, etc.);

To provide a well-maintained and efficient transportation network for the Pioneer Valley region, it is important that the municipalities adopt suitable plans, policies, and programs for guiding future

transportation and land use improvements in their areas, and that these municipal plans and programs be coordinated with regional planning efforts.

2. The Pioneer Valley Metropolitan Planning Organization (MPO)

The Pioneer Valley Metropolitan Planning Organization implements and oversees the 3C transportation planning process in the Pioneer Valley region. The objective of the **3C** transportation planning process is to assist, support, and provide the capability to maintain an open **comprehensive, cooperative, and continuing** transportation planning and programming process at all levels of government in conformance with applicable federal and state requirements and guidelines. The Pioneer Valley MPO was restructured in September of 1998 to increase the role of the local communities in the transportation planning process. The number of voting members was increased from four to eight and consists of the following officials or their designee or alternate.

- The Secretary of the Executive Office of Transportation and Construction
- The Commissioner of the Massachusetts Highway Department
- The Chairman of the Pioneer Valley Planning Commission
- The Chairman of the Pioneer Valley Transit Authority
- The Mayor of one of the following three urban core cities within the Pioneer Valley region:

Chicopee	Holyoke	Springfield

- The Mayor or Selectman of one of the following six urban centers outside of the three core cities within the Pioneer Valley region:

Agawam	Amherst	Easthampton
Northampton	Westfield	West Springfield

- A Selectman of one of the following twelve suburban towns within the Pioneer Valley region:

Belchertown	East Longmeadow	Granby
Hadley	Longmeadow	Ludlow
Palmer	South Hadley	Southampton
Southwick	Ware	Wilbraham

- A Selectman of one of the following twenty-two rural towns within the Pioneer Valley region:

Blandford	Brimfield	Chester
Chesterfield	Cummington	Goshen
Granville	Hampden	Hatfield
Holland	Huntington	Middlefield
Montgomery	Monson	Pelham
Plainfield	Russell	Tolland
Wales	Westhampton	Williamsburg
Worthington		

In addition, the Joint Transportation Committee (JTC) Chairman, and one representative each from both the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), the

four alternate community representatives, and one representative each from both the Massachusetts Highway Department District One and District Two Offices shall be considered ex-officio, non-voting members of the Pioneer Valley MPO.

The MPO jointly develops, reviews, and endorses annually a Planning Work Program which includes a Unified Planning Work Program; a Transportation Plan; a Transportation Improvement program' as well as transportation plans and programs as may from time to time be required by federal and state laws and regulations. Each of the MPO members reviews regional transportation documents/plans and, if acceptable, indicates its acceptance by endorsing the document. Endorsement is made by a simple majority of those members present and voting, provided that one of the state agencies is included in the majority vote. The MPO is the forum for cooperative transportation decision-making in the Pioneer Valley region.

a) Pioneer Valley Planning Commission (PVPC)

The Pioneer Valley Planning Commission serves as the comprehensive regional planning agency for the 43 cities and towns of Hampshire and Hampden Counties in Western Massachusetts. It is one of the eight signatory bodies to the region's MPO and is responsible for guiding growth and development (both physical and economic) in the Pioneer Valley. In its role as the lead planning agency for the MPO, PVPC provides the staff to conduct MPO and other transportation planning activities for the Pioneer Valley. Transportation planning funds come from many sources including, its member communities, the Federal Highway Administration, the Federal Transit Administration, the Massachusetts Highway Department, the Massachusetts Executive Office of Transportation and Construction, and the Pioneer Valley Transit Authority, among others.

b) Pioneer Valley Transit Authority (PVTA)

The PVTA is the regional transit authority in the Pioneer Valley. Like PVPC, it is also a signatory agency to the region's MPO. The Pioneer Valley Transit Authority provides transit services and some special paratransit services to 24 cities and towns in the region through contracts with two operators (UMass Transit, and Transit Express) and multiple paratransit operators.

The PVPC provides a significant amount of planning support to the PVTA through a contractual agreement. Further, PVPC includes transit improvement projects in the Transportation Improvement Program (TIP) and in the Regional Transportation Plan (RTP), both of which serve as guides for determining future facilities and service improvements of the PVTA. PVTA receives funds from the Federal Transit Administration, the Massachusetts Executive Office of Transportation and Construction, its member communities and passenger fares.

c) Executive Office of Transportation and Construction (EOTC)

This state agency is, in general, responsible for coordinating all state transportation planning and construction. The EOTC is one of the two state signatories to the Pioneer Valley MPO. Housed within the EOTC are a number of state agencies, including the Massachusetts Highway Department and the Massachusetts Aeronautics Commission, that plan and implement actual transportation improvements.

d) Massachusetts Highway Department (MassHighway)

The Massachusetts Highway Department is one of the two state signatories to the Pioneer Valley MPO. This department is directly involved with the Commonwealth's highway system and is responsible for engineering and implementing highway-related projects. In addition, MassHighway prepares the annual State Program of Transportation Projects, which is submitted to the Federal Highway Administration for approval and funding.

MassHighway has a total of five district offices representing distinct areas of the state. The majority of the Pioneer Valley region is located MassHighway District Two, with the westernmost portion of the region falling in MassHighway District One

e) Joint Transportation Committee (JTC)

The JTC is a committee comprised of representatives of local, regional and state governments, as well as private groups and individuals involved in providing transportation facilities, services, and/or planning, including, Peter Pan Bus Lines, Inc., the Pioneer Valley Railroad, and the Westfield Airport.

The JTC was established by the 3C Memorandum of Understanding for the purpose of incorporating citizen participation in the transportation planning process. It is intended that the JTC be representative of both public and private interests in the region and provide a forum for reviewing transportation plans and projects, offering comments and recommendations to guide transportation planning and transportation improvements in the region. The JTC also serves in an advisory capacity to the MPO as they decide on whether accepting and endorsing a plan or project is appropriate. The JTC plays a key role in reviewing documents such as the Regional Transportation Plan, the annual Transportation Improvement Program and the Unified Transportation Work Program.

3. Other State Agencies

In addition to federal funds made available by TEA-21, the state spends a large portion of its own available funds on transportation improvement projects. All federal funds received by the Commonwealth for transportation projects must be supplemented with a state match (usually 80% federal/ 20% state ratio). The state also provides assistance to municipalities for some local street improvements, as well as providing funding assistance for mass transit, school transportation, and special paratransit services. In order to provide these funds, the Commonwealth's Legislature enacts a transportation bond bill periodically. In each Transportation Bond, funds are appropriated to communities based on a formula under the provisions of MGL Chapter 90, section 34. These funds are commonly known as Chapter 90 funds. The Chapter 90 highway formula is comprised of three variables: local road mileage (58.33 percent), employment figures (20.83 percent) and population estimates (20.83 percent). Under this formula, those communities with a larger number of road miles receive proportionately more aid than those with fewer road miles. Transportation Bonds have also earmarked funds for the design and/or construction of specific projects. Funding for these projects has occurred at the discretion of the legislature.

a) Department of Environmental Protection (DEP)

The Clean Air Act Amendments of 1990 require all states that do not meet federal air quality standards to prepare a State Implementation Plan (SIP) identifying specific strategies for achieving National Ambient Air Quality standards. The Commonwealth of Massachusetts is considered a non-attainment area, meaning that it does not meet the established air quality standards. The lead organization in preparing the required SIP is the Department of Environmental Protection. DEP monitors the air quality status and recommended improvement strategies (by region) from the Commonwealth's thirteen (13) Regional Planning Agencies. This information is then used to prepare a statewide strategy for meeting federal air quality standards.

b) Massachusetts Turnpike Authority

Funded entirely through tolls administered by the Massachusetts Turnpike Authority, the Massachusetts Turnpike is aligned along the entire width of the Pioneer Valley from east to west. Recently, tolls for passenger vehicles travelling between exits 1 – 6 were eliminated. This enables passenger vehicles travelling between Springfield and Westfield to utilize the turnpike for free in the Pioneer Valley region.

c) Metropolitan District Commission (MDC)

The state's Metropolitan District Commission owns and maintains roads on its lands, which in this region lie primarily in the vicinity of the Quabbin Reservoir.

4. Federal Agencies

The federal government and its various agencies develop national transportation policies and are the principal funding source for many transportation improvements. Most federal activity is exercised through agencies of the US Department of Transportation (DOT), but the US Department of Health and Human Services (HHS) also provides some transportation assistance, predominantly paratransit funding.

a) Department of Transportation (DOT)

The US Department of Transportation administers and coordinates highway, transit, air, and rail planning at the federal level in addition to a substantial number of assistance programs to state and local governments. Specific activities (typically broken down by mode) are handled by individual federal agencies housed within the Department of Transportation. These agencies include the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Federal Aviation Administration (FAA), the United States Coast Guard (USCG), the Surface Transportation Board (STB) and the Federal Railroad Administration (FRA).

(i) Federal Highway Administration (FHWA)

The FHWA performs its mission through three main programs:

The Federal-Aid Highway Program provides federal financial assistance to the States to construct and improve the National Highway System, urban and rural roads, and bridges. The program provides funds for general improvements and development of safe highways and roads.

The Motor Carrier Safety Program develops regulations and enforces federal requirements for the safety of trucks and buses to reduce commercial vehicle accidents. It also governs hazardous cargoes as they move over the nation's highways.

The Federal Lands Highway Program provides access to and within national forests, national parks, Indian reservations and other public lands by preparing plans, letting contracts, supervising construction facilities, and conducting bridge inspections and surveys.

(ii) Federal Transit Administration (FTA)

FTA is the primary federal funding source for planning and implementing mass transportation improvements. FTA provides financial assistance for both urban and rural mass transportation, and subsidizes some paratransit services for non-profit organizations. Both capital and operating funds are made available.

(iii) Federal Aviation Administration (FAA)

FAA provides funding assistance for airport planning and construction, as well as for air traffic control, establishment of safety standards and inspection of accidents.

(iv) Federal Railroad Administration (FRA)

FRA is a regulatory body concerned with safety issues related to rail traffic. The FRA is responsible for investigating rail accidents, but also works to develop and implement programs to promote safe rail operation.

b) Department of Health and Human Services

The Department of Health and Human Services assists service agencies in their effort to provide transportation for the elderly, medical services, and community service operations. Most of these are paratransit services.

5. Other Transportation Planning and Service Organizations

In addition to the many local, state, and federal government agencies involved in transportation planning and improvements, other public and private organizations are also important to the operation and improvement of transportation facilities and services in the Pioneer Valley region.

A number of social and human service agencies in the Pioneer Valley region operate paratransit service. Although some of these operators receive federal assistance, many are privately operated and funded.

Amtrak is the primary provider of intercity passenger rail service. No commuter rail is offered for inter-regional commuters to areas like Hartford and Boston.

CSX Transportation took over Conrail's operations in the Pioneer Valley region in June of 1999. They are the largest rail freight operator in the region with providing services to the eastern half of the US. Several short lines and one regional railroad also operate freight service within the region.

Many associations of transportation service providers, such as the American Trucking Association (ATA), are working within federal and state legislation to enact changes that have the potential to impact transportation planning and the focus of transportation improvements.

Pursuant to the goals of TEA-21, transportation planning in the Pioneer Valley has been very successful in involving business leaders, environmentalists and developers. Efforts like the Plan for Progress and the Regional Land Use Plan bring these new partners to the transportation planning table.

C. KEY PRODUCTS

1. Regional Transportation Plan

The TEA-21 legislation builds on the Intermodal Surface Transportation Efficiency Act of 1991 which emphasized the development and use of the Regional Transportation Plan (RTP) in the planning process. TEA-21 encourages the involvement of public officials and private citizens in the development of the RTP. The RTP is envisioned to be the central mechanism for structuring effective investments to enhance overall transportation efficiency. This provides for the development, management, and operation of transportation systems and facilities for the region.

The RTP is required to address both long range and short range needs. Each element is to identify transportation systems conditions such as demand, capacity, deficiencies, improvement alternatives, financial constraints and environmental benefits. The long-range element is to address at least a twenty-year planning horizon while the short-range element addresses a three to five year horizon.

The RTP is scheduled to be updated at least every three years in non-attainment areas and every five years in attainment areas. This schedule ensures that the plans maintain validity and consistency with current and forecasted transportation and land use conditions and trends.

2. Transportation Improvement Program

The Transportation Improvement Program (TIP) is the central program management tool for structuring transportation programs. The TIP is to be fully consistent with the RTP and the planning process. In doing this, the projects identified in the TIP will concur with the goals, policies and objectives of the RTP.

The TIP is scheduled for update every year. Additional changes may be made to the TIP after the required public participation and an MPO meeting. The current TIP identifies a six year listing of projects for implementation. The TIP must be fiscally constrained, and programmed according to a regional target (estimate of federal funds) which is provided by MHD. All projects, regardless of funding source, are to be identified in the TIP.

Projects identified in the TIP are to be prioritized. Conformity to environmental regulations is key in determining the feasibility and priority of projects. Environmental analysis will also assist in identifying the funding source of projects based on federal restrictions.

The TIP shall also be available for public official review and comment. Included in this public participation is the update on the amendment process associated with the TIP.

CHAPTER 3

REGIONAL PROFILE

Social and economic trends can have significant implications on transportation planning. This chapter presents a profile of the region's physical, socioeconomic, demographic and environmental characteristics as they relate to transportation planning and construction.

A. PHYSICAL CHARACTERISTICS

The Pioneer Valley Region is located in the midwestern section of Massachusetts. It is the fourth largest metropolitan area in New England, covering 1,178 square miles. The Pioneer Valley is bisected by the Connecticut River and is bounded on the north by Franklin County, on the south by the State of Connecticut, on the east by Quabbin Reservoir and Worcester County and on the west by Berkshire County.

The Pioneer Valley Region is comprised of the 43 communities from Hampden and Hampshire counties. Hampden County, the most populous of the four western counties of Massachusetts, is approximately 635 square miles. Hampden County is made up of 23 communities including the Springfield-Chicopee-Holyoke urbanized area. Hampshire County is situated in the middle of Western Massachusetts and includes an area of 544 square miles.

Springfield, the third largest city in Massachusetts, is the Region's cultural and economic center. Springfield is home to half of the region's twenty largest employers, including Massachusetts Mutual Life Insurance Company, Solutia (formerly the Monsanto Chemical Company) and Smith & Wesson Company. Major cultural institutions include the Springfield Symphony, City Stage (formerly Stage West), Springfield Civic Center, Springfield Library and Museums Association, and the Basketball Hall of Fame.

The cities of Holyoke and Chicopee were the first planned industrial communities in the nation. Merchants built an elaborate complex of mills, workers housing, dams and canal systems that evolved into cities. While many of the historic mills and industries are now gone, many 19th and 20th Century structures are maintained.

The Pioneer Valley Region is unique within the Commonwealth of Massachusetts, containing a diverse economic base, internationally known educational institutions, and limitless scenic beauty. Dominant physical characteristics include the broad fertile agricultural valley formed by the Connecticut River, the Holyoke Mountain Range that traverses the region from Southwick to Pelham, and the foothills of the Berkshire Mountains. Prime agricultural land, significant wetlands, and scenic rivers are some of the region's premier natural resources. Choices in lifestyle range from contemporary downtown living to stately historic homes, characteristic suburban neighborhoods, and rural living in very small communities. The variety of lifestyles contributes to the diversity and appeal of the region. The Pioneer Valley provides an exceptional environment in which to live and work, due to its unique combination of natural beauty, cultural amenities, and historical character.

1. Roadway Network

The Federal-Aid highway system in the Pioneer Valley region consists of approximately 1,317 miles, of which approximately 217 miles are on the National Highway System (NHS), and approximately 1,100 miles belong to the Surface Transportation Program (STP). The STP is a block grant type

program that includes NHS roadways which primarily consist of Interstate routes and a large percentage of urban and rural principal arterials. The Federal-Aid highway system consists of any roadway that is not functionally classified as a rural minor collector or local roadway. Local roads constitute approximately 65% of the total roadway system.

The roadway mileage in the Pioneer Valley has remained fairly consistent over the last several years, since the construction of Interstate 391. New roadway construction has become more difficult in recent years as a result of rising construction costs and the requirements of the Clean Air Act Amendments of 1990. The last major new roadway to be constructed in the region occurred in 1996 when a portion of Route 57 was relocated in Agawam. This project extended the existing limited access portion of Route 57 out to Route 187.

2. Transit Routes

The Pioneer Valley Transit Authority (PVTA) operates a fleet of 167 buses, all of which are wheel chair equipped. Comprehensive transit service is provided on a network of 44 fixed routes and 2 community shuttles in the regions major urban centers, as well as outlying suburban areas. The PVTA was formed on August 20, 1974 with the purpose of rebuilding and expanding the region's transit fleet and services. Today, the PVTA offers cost-effective service to the members of its 24 cities and towns, 22 located in Hampden and Hampshire County and two in Franklin County.

The communities that compose the PVTA district can be divided into two basic areas: the northern tier and the southern tier. The northern tier is predominantly suburban and is composed of the communities of Amherst, Belchertown, Easthampton, Hadley, Leverett, Northampton, Pelham, Sunderland, Ware, and Williamsburg. The southern tier may be divided into an urban core, composed of Springfield, Chicopee, and Holyoke, and a suburban area composed of Agawam, East Longmeadow, Granby, Hampden, Longmeadow, Ludlow, Palmer, South Hadley, West Springfield, Westfield, and Wilbraham.

3. Bicycle and Pedestrian Facilities

In the Pioneer Valley 0.3 percent of all residents commute to work by bicycle and 6.1 percent walk to work. [1] Development patterns in the region are characterized as sprawl. There are many areas in the region such as downtown Springfield that are very "walkable" as well as communities like Amherst where cyclists will find bike lanes, bike racks, and multi-use paths. There also are many reasons why people might choose to walk or to ride a bicycle to work, school, and play in the Pioneer Valley. Walking and riding bicycles instead of driving a car promotes individual health and well being. Walking and bicycling help prevent traffic congestion and a commitment to bicycling and walking can help prevent downtown deterioration and discourage sprawl.

To get more people walking and biking PVPC has developed a strategic plan of policy-related actions and physical projects on which municipal and regional officials and citizens can collaborate to improve conditions for pedestrians and bicyclists in the Pioneer Valley. The Plan includes information and recommendations on incorporating bicycle and pedestrian features into road reconstruction

[1] "Transportation: A View of our Valley: A Statistical Look at the Pioneer Valley Region, 1993-PVPC.

projects, using zoning and development tools to help create environments that support bicycling and walking, increasing bicycle and pedestrian safety, and promoting bicycling and pedestrian activities as alternative transportation choices. The plan was developed by the Non-Motorized Sub-Committee of the Pioneer Valley Planning Commission's (PVPC) Joint Transportation Committee as the bicycle and pedestrian component to the Regional Transportation Plan. Copies of the "Bike and Ped Plan" are available upon request.

4. Passenger Rail

Passenger rail service is available to Pioneer Valley residents through Amtrak, the National Railroad Passenger Corporation. The region's main train station is located in the City of Springfield, on Lyman Street near the northern edge of downtown Springfield. Amtrak uses the station tracks of the former Union Station. By 1994 Amtrak had constructed a "temporary" station at track level on the south side of the tracks facing downtown Springfield.

The Springfield station is currently served by 14 trains daily providing extensive service in the northeastern U.S. and connections nationwide. Passenger Rail service is provided on both East-West routes and North-South Routes through the region. The Pioneer Valley has an additional station located in Amherst that is served by two trains per day.

B. POPULATION

1. Trends

The population in the Pioneer Valley Region grew at a modest rate during the 1980s increasing 3.6% to 602,878 residents. This is compared to a 4.9% increase for the Commonwealth of Massachusetts, 7.0% for New England, and 8.2% for the United States as a whole. Based on the estimated population for 1997, many communities that experienced an increase in population from 1980 to 1990 are now projected to have a decrease in population from 1990 – 1997. The population of the Pioneer Valley as a whole is estimated to have increased slightly by 1.4% from 1990 – 1997. This can be partially attributed to the "recession" of the early 1990's. All total, 9 of the region's 43 communities are estimated to have a decrease in population from 1990 – 1997. This includes the three urban core cities of Chicopee, Holyoke, and Springfield. Table 3 - 1 presents the population trends experienced within the region between 1950 and 1997.

Table 3 - 2 shows the shift of population from urban areas to suburban and rural areas over the past 47 years. Suburbanization of the region became prominent in the 1950's when the communities adjacent to the urban core cities experienced unprecedented rates of growth. In the 1990's, the highest rates of growth were found at the edges of the classic suburbs, in the region's rural communities. Belchertown, for example, which has the largest area of any community in the region, continues to grow and is projected to have a 17.1% increase in population from 1990 – 1997. Other communities estimated to have significant population growth include Amherst (15.2%), Huntington (13.5%), Middlefield (12.2%), Monson (16.7%), Southampton (15.6%), Southwick (14.2%), Westhampton (13.6%), and Worthington (13.8%).

2. Projections

The population of the Pioneer Valley Region is projected to rebound from the decline experienced in the early 1990's. Projections indicate a modest rate of growth through the year 2010. The projected rates of change are smaller than those experienced during the 1980's, with an increase of 4.3% from 1990 to 2000, 1.8% from 2000 to 2005, and 2.8% from 2005 to 2010. This rate of growth is shown graphically on Figure 3-1 and is due to relatively low birth rates, which are expected to continue into

the future. Table 3-3 summarizes the population projections and dicennial percent change for each community to the year 2010.

Table 3-1 - Pioneer Valley Region Population Change

	1950	1960	1970	1980	1990	1997 Est.
Agawam	10,166	15,781	21,717	26,271	27,323	29,045
Amherst	10,856	13,781	26,331	33,229	35,228	40,597
Belchertown	4,487	5,186	5,936	8,339	10,579	12,384
Blandford	597	636	863	1,038	1,187	1,182
Brimfield	1,182	1,414	1,907	2,317	3,001	3,256
Chester	1,292	1,155	1,025	1,123	1,280	1,399
Chesterfield	496	556	704	1,000	1,048	1,062
Chicopee	49,211	61,553	66,676	55,112	56,632	54,378
Cummington	620	550	562	657	785	798
East Longmeadow	4,881	10,294	13,029	12,905	13,367	14,416
Easthampton	10,694	12,326	13,012	15,580	15,537	15,778
Goshen	321	385	483	651	830	872
Granby	1,816	4,221	5,473	5,380	5,565	6,059
Granville	740	874	1,008	1,204	1,403	1,449
Hadley	2,639	3,099	3,750	4,125	4,231	4,587
Hampden	1,322	2,345	4,572	4,745	4,709	4,731
Hatfield	2,179	2,350	2,825	3,045	3,184	3,131
Holland	377	561	931	1,589	2,185	2,307
Holyoke	54,661	52,689	50,112	44,678	43,704	41,194
Huntington	1,256	1,392	1,593	1,804	1,987	2,255
Longmeadow	6,508	10,565	15,630	16,301	15,467	15,408
Ludlow	8,660	13,805	17,580	18,150	18,820	18,762
Middlefield	295	315	288	385	392	440
Monson	6,125	6,712	7,355	7,315	7,776	9,078
Montgomery	157	333	446	637	759	722
Northampton	29,603	30,058	29,664	29,286	29,289	29,739
Palmer	9,533	10,358	11,680	11,389	12,054	12,421
Pelham	579	805	937	1,112	1,373	1,467
Plainfield	228	237	287	425	571	529
Russell	1,298	1,366	1,382	1,570	1,594	1,713
South Hadley	10,145	14,956	17,033	16,399	16,685	18,022
Southampton	1,387	2,192	3,069	4,137	4,478	5,177
Southwick	2,855	5,139	6,330	7,382	7,667	8,752
Springfield	162,399	174,463	163,905	152,319	156,983	148,178
Tolland	107	101	172	235	289	310
Wales	497	659	852	1,177	1,566	1,675
Ware	7,517	7,517	8,187	8,953	9,808	10,199
West Springfield	20,438	24,924	28,461	27,042	27,537	28,507
Westfield	20,962	26,302	31,433	36,465	38,372	40,446
Westhampton	452	583	793	1,137	1,327	1,508
Wilbraham	4,003	7,387	11,984	12,053	12,635	13,359
Williamsburg	2,056	2,186	2,342	2,237	2,515	2,655
Worthington	462	597	712	932	1,156	1,316
Pioneer Valley Region	456,059	532,708	583,031	581,830	602,878	611,263
Massachusetts	4,691,000	5,149,000	5,689,170	5,737,037	6,016,425	6,147,132

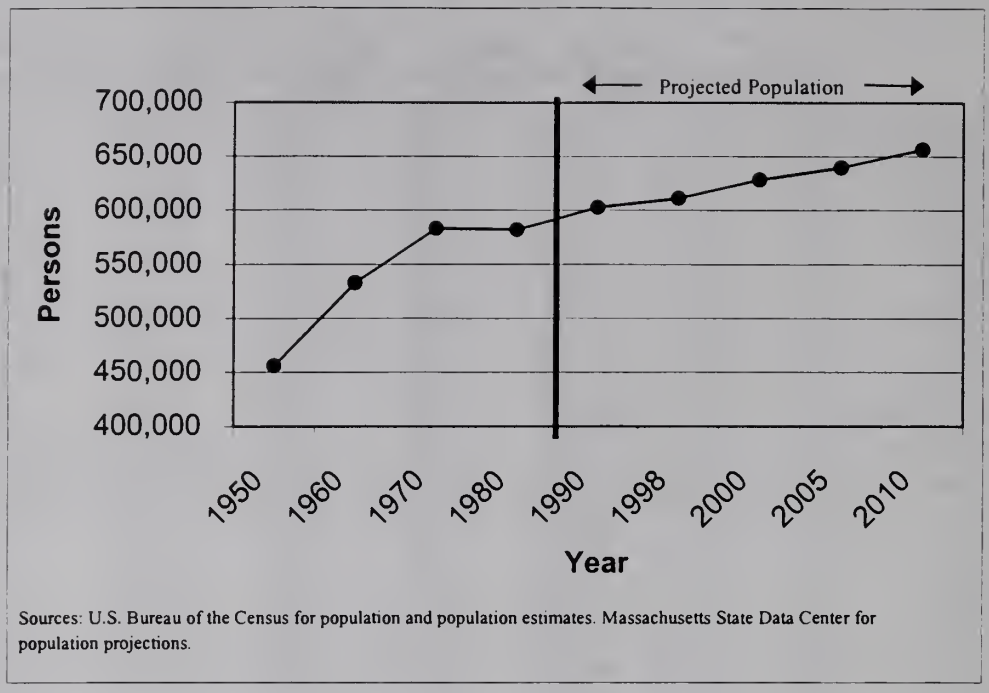
Source: U.S. Bureau of the Census

Table 3-2 - Rate of Population Change by Community

	1950 to 1960	1960 to 1970	1970 to 1980	1980 to 1990	1990 to 1997 (est.)
Agawam	55.2%	37.6%	21.0%	4.0%	6.3%
Amherst	26.9%	91.1%	26.2%	6.0%	15.2%
Belchertown	15.6%	14.5%	40.5%	26.9%	17.1%
Blandford	6.5%	35.7%	20.3%	14.4%	(0.4%)
Brimfield	19.6%	34.9%	21.5%	29.5%	8.5%
Chester	(10.6%)	(11.3%)	9.6%	14.0%	9.3%
Chesterfield	12.1%	26.6%	42.0%	4.8%	1.3%
Chicopee	25.1%	8.3%	(17.3%)	2.8%	(4.0%)
Cummington	(11.3%)	2.2%	16.9%	19.5%	1.7%
East Longmeadow	110.9%	26.6%	(1.0%)	3.6%	7.8%
Easthampton	15.3%	5.6%	19.7%	(0.3%)	1.6%
Goshen	19.9%	25.5%	34.8%	27.5%	5.1%
Granby	132.4%	29.7%	(1.7%)	3.4%	8.9%
Granville	18.1%	15.3%	19.4%	16.5%	3.3%
Hadley	17.4%	21.0%	10.0%	2.6%	8.4%
Hampden	77.4%	95.0%	3.8%	(0.8%)	0.5%
Hatfield	7.8%	20.2%	7.8%	4.6%	(1.7%)
Holland	48.8%	66.0%	70.7%	37.5%	5.6%
Holyoke	(3.6%)	(4.9%)	(10.8%)	(2.2%)	(5.7%)
Huntington	10.8%	14.4%	13.2%	10.1%	13.5%
Longmeadow	62.3%	47.9%	4.3%	(5.1%)	(0.4%)
Ludlow	59.4%	27.3%	3.2%	3.7%	(0.3%)
Middlefield	6.8%	(8.6%)	33.7%	1.8%	12.2%
Monson	9.6%	9.6%	(0.5%)	6.3%	16.7%
Montgomery	112.1%	33.9%	42.8%	19.2%	(4.9%)
Northampton	1.5%	(1.3%)	(1.3%)	0.0%	1.5%
Palmer	8.7%	12.8%	(2.5%)	5.8%	3.0%
Pelham	39.0%	16.4%	18.7%	23.5%	6.8%
Plainfield	3.9%	21.1%	48.1%	34.4%	(7.4%)
Russell	5.2%	1.2%	13.6%	1.5%	7.5%
South Hadley	47.4%	13.9%	(3.7%)	1.7%	8.0%
Southampton	58.0%	40.0%	34.8%	8.2%	15.6%
Southwick	80.0%	23.2%	16.6%	3.9%	14.2%
Springfield	7.4%	(6.1%)	(7.1%)	3.1%	(5.6%)
Tolland	(5.6%)	70.3%	36.6%	23.0%	7.3%
Wales	32.6%	29.3%	38.1%	33.1%	7.0%
Ware	0.0%	8.9%	9.4%	9.5%	4.0%
West Springfield	21.9%	14.2%	(5.0%)	1.8%	3.5%
Westfield	25.5%	19.5%	16.0%	5.2%	5.4%
Westhampton	29.0%	36.0%	43.4%	16.7%	13.6%
Wilbraham	84.5%	62.2%	0.6%	4.8%	5.7%
Williamsburg	6.3%	7.1%	(4.5%)	12.4%	5.6%
Worthington	29.2%	19.3%	30.9%	24.0%	13.8%
Pioneer Valley Region	16.8%	9.4%	(0.2%)	3.6%	1.4%
Massachusetts	9.8%	10.5%	0.8%	4.9%	2.2%

Source: U.S Bureau of the Census

Figure 3-1 - Total Population for the Pioneer Valley



Sources: U.S. Bureau of the Census for population and population estimates. Massachusetts State Data Center for population projections.

3. Ethnic and Racial Diversity

The Region's ethnic and racial mix is becoming more diverse. In 1980, Blacks, Hispanics, American Indians, Asians and other minorities as defined by the U.S. Census Bureau comprised 10% of the total population. In 1990 these population groups made up 15% of the region's citizens and accounted for the region's population growth during the decade. Between 1980 and 1990 the non-Hispanic white population increased by 2,036 people (0.3%) while the Hispanic population grew by 25,192 (129%). The number of Black population increased by 7,675 (26%), the Asian population grew by 5,635 (208%), and American Indians increased 528 (100%). The Region's ethnic and racial mix is becoming more diverse.

The region's minority population is predominantly concentrated in either the urban core area or its surrounding communities. With the region's population increase attributed primarily to growth in minority groups, it can be inferred that the bulk of the additional population is located in or around the Springfield-Chicopee-Holyoke urbanized area. In addition, the average annual income for minorities is, generally, less than that for non-minorities. Combined, these factors indicate that the region's urban area may experience an increase in demand for transit service, along with some increase in the number of vehicles and vehicle miles traveled.

Table 3-3 - Pioneer Valley Region Projected Population Change

Community	1990	Projected Population			Percent Change		
		2000	2005	2010	1990 to 2000	2000 to 2005	2005 to 2010
Agawam	27,323	30,260	30,867	31,356	10.7%	2.0%	1.6%
Amherst	35,228	44,644	46,614	51,851	26.7%	4.4%	11.2%
Belchertown	10,579	13,224	14,485	15,907	25.0%	9.5%	9.8%
Blandford	1,187	1,325	1,410	1,491	11.6%	6.4%	5.7%
Brimfield	3,001	3,411	3,666	3,917	13.7%	7.5%	6.8%
Chester	1,280	1,348	1,406	1,456	5.3%	4.3%	3.6%
Chesterfield	1,048	1,050	1,010	977	0.2%	(3.8%)	(3.3%)
Chicopee	56,632	56,678	56,748	57,041	0.1%	0.1%	0.5%
Cummington	785	856	897	943	9.0%	4.8%	5.1%
East Longmeadow	13,367	14,787	15,149	15,303	10.6%	2.4%	1.0%
Easthampton	15,537	16,504	16,574	16,601	6.2%	0.4%	0.2%
Goshen	830	1,049	1,153	1,265	26.4%	9.9%	9.7%
Granby	5,565	6,359	6,545	6,693	14.3%	2.9%	2.3%
Granville	1,403	1,660	1,789	1,913	18.3%	7.8%	6.9%
Hadley	4,231	4,591	4,640	4,707	8.5%	1.1%	1.4%
Hampden	4,709	4,903	4,974	5,048	4.1%	1.4%	1.5%
Hatfield	3,184	3,504	3,587	3,700	10.1%	2.4%	3.2%
Holland	2,185	2,493	2,765	3,087	14.1%	10.9%	11.6%
Holyoke	43,704	38,623	38,206	38,446	(11.6%)	(1.1%)	0.6%
Huntington	1,987	2,558	2,773	3,008	28.7%	8.4%	8.5%
Longmeadow	15,467	16,356	16,401	16,253	5.7%	0.3%	(0.9%)
Ludlow	18,820	20,189	20,703	21,178	7.3%	2.5%	2.3%
Middlefield	392	484	510	539	23.5%	5.4%	5.7%
Monson	7,776	8,040	8,128	8,198	3.4%	1.1%	0.9%
Montgomery	759	809	870	920	6.6%	7.5%	5.7%
Northampton	29,289	31,485	31,984	32,630	7.5%	1.6%	2.0%
Palmer	12,054	12,883	13,211	13,612	6.9%	2.5%	3.0%
Pelham	1,373	1,509	1,616	1,726	9.9%	7.1%	6.8%
Plainfield	571	649	739	846	13.7%	13.9%	14.5%
Russell	1,594	1,874	1,937	2,005	17.6%	3.4%	3.5%
South Hadley	16,685	20,302	21,629	23,137	21.7%	6.5%	7.0%
Southampton	4,478	5,475	5,687	5,865	22.3%	3.9%	3.1%
Southwick	7,667	8,809	9,114	9,424	14.9%	3.5%	3.4%
Springfield	156,983	144,272	143,106	143,474	(8.1%)	(0.8%)	0.3%
Tolland	289	244	256	261	(15.6%)	4.9%	2.0%
Wales	1,566	1,809	2,068	2,350	15.5%	14.3%	13.6%
Ware	9,808	10,861	11,437	12,138	10.7%	5.3%	6.1%
West Springfield	27,537	29,194	29,582	30,071	6.0%	1.3%	1.7%
Westfield	38,372	43,958	45,417	46,804	14.6%	3.3%	3.1%
Westhampton	1,327	1,595	1,689	1,775	20.2%	5.9%	5.1%
Wilbraham	12,635	13,687	13,983	14,041	8.3%	2.2%	0.4%
Williamsburg	2,515	2,758	2,846	2,927	9.7%	3.2%	2.8%
Worthington	1,156	1,468	1,566	1,683	27.0%	6.7%	7.5%
Pioneer Valley Region	602,878	628,537	639,737	656,567	4.3%	1.8%	2.6%

Source: Population projections prepared by Mass. Institute for Social and Economic Research, Univ. of Mass. Amherst. 1990 population is from the 1990 Census of Population.

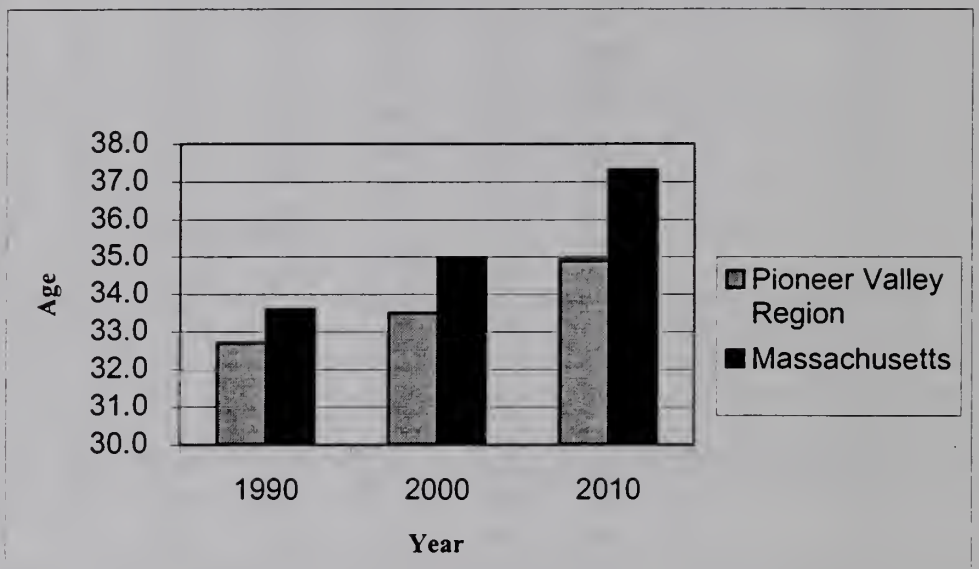
4. Age

Reflecting the national trend in which the population is aging, all but Amherst, Chester and Holyoke experienced an increase in median age. Since 1970, the region's median age has been increasing and is projected to continue to do so through 2010. The 1990 estimated median age in the region is 32.7, up from 30.3 in 1980. The median age is expected to increase over the next ten years as shown in Figure 3-2.

Although the total population is not expected to increase by large amounts, significant increases in the older age groups and decreases in the younger age groups are expected over the next two decades. The age distribution in population will be shifting over the next ten years.

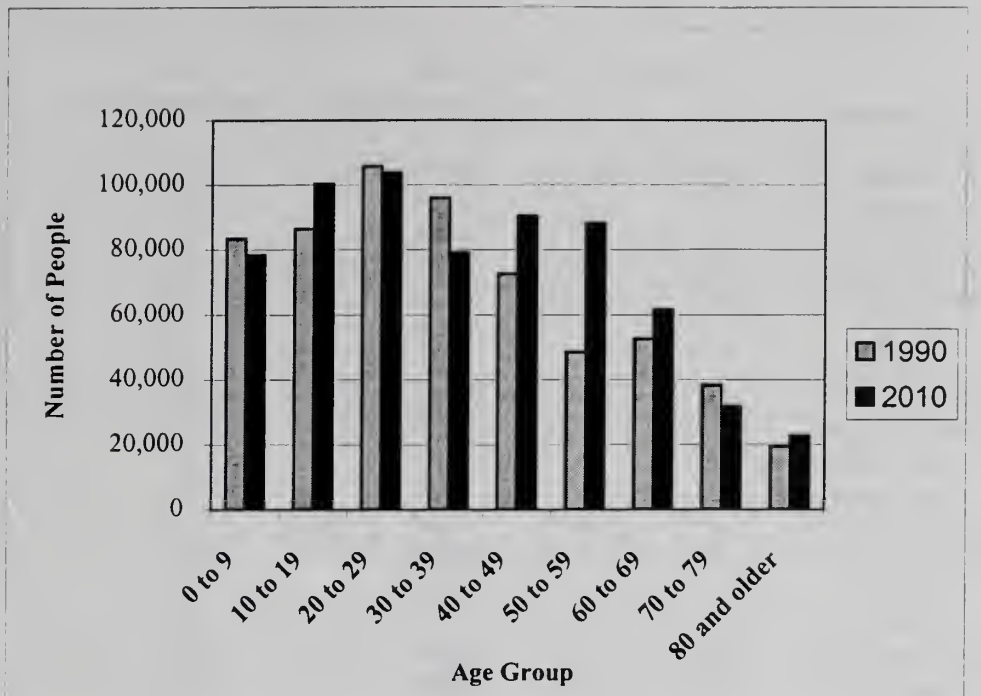
Figure 3-3 shows how population is distributed among age groups in 2010 compared with 1990. Note that population in the age groups 50 to 69 will be the most dramatically different between 1990 and 2010.

Figure 3-2 - Median Age



Sources: 1990 Census of Population. Massachusetts State Data Center for population projections.

Figure 3-3 - Projected Population by Age Group for the Pioneer Valley Region



Sources: 1990 Census of Population; Massachusetts State Data Center for population projections

C. HOUSING

1. Household growth

The number of new housing units grew between 1980 and 1990 at a rate 2 and 1/2 times faster than the population. In 1980 the region had 202,025 households and by 1990 that number had risen 9 % to 219,958. Between 1980 and 1990, the number of total households (households is defined as all persons who occupy a housing unit in which the occupants live and eat separately from any other persons in the building and they have direct access to the unit from the outside of the building or through a common hall) within Hampden County increased by 7 percent from 157,768 to 169,897. This increase occurred predominantly in the number of households of four or fewer persons. Hampshire County experienced an overall increase in households of 12 percent from 44,257 to 50,052 during the same period. (See Table 3-4).

Similar to the pattern in which substantial rates of population growth occurred in the region's rural communities, the top five communities in the region with the highest rates of new housing units were Belchertown (33%), Cummington (32%), Pelham (25%), Blandford (25%) and Goshen (24%).

Table 3-4 - Total Households – 1980 Vs. 1990

Community	1980 Total Households	1990 Total Households	Percent Change
Agawam	9,355	10,432	11.5
Amherst	7,606	8,477	11.5
Belchertown	2,824	3,825	35.4
Blandford	343	424	23.6
Brimfield	820	1,078	31.5
Chester	409	464	13.4
Chesterfield	368	360	-2.2
Chicopee	20,353	22,625	11.2
Cummington	259	317	22.4
East Longmeadow	4,271	4,670	9.3
Easthampton	5,715	6,170	8.0
Goshen	204	301	47.5
Granby	1,703	1,939	13.9
Granville	404	483	19.6
Hadley	1,511	1,633	8.1
Hampden	1,490	1,620	8.7
Hatfield	1,075	1,266	17.8
Holland	542	791	45.9
Holyoke	16,562	15,850	-4.3
Huntington	611	703	15.1
Longmeadow	5,020	5,360	6.8
Ludlow	5,975	6,957	16.4
Middlefield	139	146	5.0
Monson	2,373	2,642	11.3
Montgomery	204	250	22.5
Northampton	10,235	11,164	9.1
Palmer	4,227	4,781	13.1
Pelham	383	492	28.5
Plainfield	153	209	36.6
Russell	540	557	3.1
South Hadley	5,242	5,884	12.2
Southampton	1,353	1,543	14.0
Southwick	2,464	2,713	10.1
Springfield	55,158	57,769	4.7
Tolland	90	108	20.0
Wales	378	550	45.5
Ware	3,381	3,836	13.5
West Springfield	10,488	11,485	9.5
Westfield	12,409	13,823	11.4
Westhampton	379	442	16.6
Wilbraham	3,893	4,474	14.9
Williamsburg	798	933	16.9
Worthington	318	412	29.6
Pioneer Valley Region	**202,025**	**219,958**	**8.9**

Source: U.S. Census Bureau, 1980 Census of Population and Housing:
General Population and Housing Characteristics for Massachusetts.
1990 U.S. Census

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Table 3-5 - Household Size – 1960 to 1990

Year	Number of Households						
	1 Person	2 People	3 People	4 People	5 People	6 or More People	**Total**
1960	21,425 13.7%	42,454 27.1%	31,047 19.8%	28,406 18.1%	18,306 11.6%	15,232 9.7%	**156,870** **100.0%**
1970	32,998 18.5%	50,799 28.5%	31,071 17.5%	27,378 15.4%	17,644 9.9%	18,092 10.2%	**177,982** **100.0%**
1980	47,036 23.3%	62,661 31.0%	35,616 17.6%	31,060 15.4%	15,514 7.6%	10,393 5.1%	**202,280** **100.0%**
1990	55,863 25.4%	68,760 31.3%	39,324 17.9%	34,276 15.6%	14,429 6.6%	7,306 3.2%	**219,958** **100.0%**

Source: 1960-1990 U.S. Census hhs.xls

Table 3-6 - Number of Households by Household Type - 1990

Community	Family Households by Size							Nonfamily Households by Size								All Households
	2 People	3 People	4 People	5 People	6 People	7 or More People	Total	1 person	2 People	3 People	4 People	5 People	6 People	7 or More People	Total	
Agawam	2,987	1,803	1,730	686	171	57	**7,434**	2,489	439	53	10	5	2	0	**2,998**	**10,432**
Amherst	1,802	1,224	983	354	93	32	**4,488**	1,943	783	453	603	132	43	32	**3,989**	**8,477**
Belchertown	1,050	649	672	274	60	43	**2,748**	769	224	49	27	5	3	0	**1,077**	**3,825**
Blandford	122	86	92	28	4	4	**336**	65	17	5	0	0	1	0	**88**	**424**
Brimfield	324	185	176	85	39	15	**824**	210	39	4	1	0	0	0	**254**	**1,078**
Chester	128	92	85	35	10	6	**356**	89	17	2	0	0	0	0	**108**	**464**
Chesterfield	101	59	73	35	10	5	**283**	52	22	2	1	0	0	0	**77**	**360**
Chicopee	6,526	3,894	3,080	1,262	391	150	**15,303**	6,403	777	100	25	10	4	3	**7,322**	**22,625**
Cummington	94	42	44	19	9	1	**209**	83	23	0	0	2	0	0	**108**	**317**
East Longmeadow	1,438	900	918	359	95	44	**3,754**	835	62	10	8	0	1	0	**916**	**4,670**
Easthampton	1,690	1,031	917	382	102	43	**4,165**	1,598	336	49	18	2	1	1	**2,005**	**6,170**
Goshen	73	63	56	25	3	2	**222**	50	25	3	1	0	0	0	**79**	**301**
Granby	545	401	366	158	53	22	**1,545**	317	66	8	3	0	0	0	**394**	**1,939**
Granville	149	91	95	50	10	4	**399**	66	13	1	3	1	0	0	**84**	**483**
Hadley	497	249	234	90	22	15	**1,107**	358	95	32	25	11	3	2	**526**	**1,633**
Hampden	459	330	345	131	30	17	**1,312**	264	34	7	3	0	0	0	**308**	**1,620**
Hatfield	363	220	211	68	17	5	**884**	305	65	8	2	2	0	0	**382**	**1,266**
Holland	215	161	145	64	17	5	**607**	144	31	7	2	0	0	0	**184**	**791**
Holyoke	3,834	2,622	2,246	1,156	523	353	**10,734**	4,467	528	87	16	13	4	1	**5,116**	**15,850**
Huntington	208	137	142	48	23	5	**563**	109	29	1	0	1	0	0	**140**	**703**
Longmeadow	1,756	1,029	1,074	431	93	39	**4,422**	854	68	8	7	1	0	0	**938**	**5,360**
Ludlow	2,003	1,332	1,294	525	144	36	**5,334**	1,418	168	27	9	1	0	0	**1,623**	**6,957**
Middlefield	41	22	31	6	2	4	**106**	32	7	1	0	0	0	0	**40**	**146**
Monson	718	506	481	213	71	17	**2,006**	525	96	14	1	0	0	0	**636**	**2,642**
Montgomery	79	34	61	26	6	1	**207**	34	7	1	1	0	0	0	**43**	**250**
Northampton	2,593	1,524	1,242	442	152	66	**6,019**	3,742	1,046	236	82	28	7	4	**5,145**	**11,164**
Palmer	1,399	836	680	274	100	39	**3,328**	1,250	182	17	2	1	0	1	**1,453**	**4,781**
Pelham	130	98	100	36	3	1	**368**	70	34	9	8	1	2	0	**124**	**492**
Plainfield	70	38	34	13	5	2	**162**	38	9	0	0	0	0	0	**47**	**209**
Russell	158	99	117	38	14	12	**438**	91	24	3	1	0	0	0	**119**	**557**
South Hadley	1,816	986	859	352	97	37	**4,147**	1,463	232	27	11	3	0	1	**1,737**	**5,884**
Southampton	442	296	321	145	30	16	**1,250**	217	56	13	5	2	0	0	**293**	**1,543**
Southwick	696	513	526	212	72	39	**2,058**	510	107	24	11	2	1	0	**655**	**2,713**
Springfield	14,406	9,658	8,002	3,809	1,580	1,065	**38,520**	16,067	2,516	414	173	47	16	16	**19,249**	**57,769**
Tolland	43	20	12	9	2	1	**87**	17	3	1	0	0	0	0	**21**	**108**
Wales	154	97	102	52	12	8	**425**	101	16	6	1	1	0	0	**125**	**550**
Ware	1,072	659	612	234	75	35	**2,687**	976	151	14	6	1	1	0	**1,149**	**3,836**
West Springfield	3,235	1,806	1,437	610	143	81	**7,312**	3,530	558	62	15	8	0	0	**4,173**	**11,485**
Westfield	3,814	2,495	2,324	906	255	103	**9,897**	3,280	525	85	25	10	0	1	**3,926**	**13,823**
Westhampton	142	68	105	50	14	0	**379**	45	14	4	0	0	0	0	**63**	**442**
Wilbraham	1,406	865	914	347	101	27	**3,660**	733	68	9	3	1	0	0	**814**	**4,474**
Williamsburg	261	171	145	61	23	8	**669**	184	62	15	1	2	0	0	**264**	**933**
Worthington	132	61	83	36	8	6	**326**	70	15	1	0	0	0	0	**86**	**412**
Pioneer Valley Region	**59,171**	**37,452**	**33,166**	**14,136**	**4,684**	**2,471**	**151,080**	**55,863**	**9,589**	**1,872**	**1,110**	**293**	**89**	**62**	**68,878**	**219,958**

Source: 1990 U.S. Census

hhsize.xls

2. Size

The average size of households in the region decreased from 1980 to 1990, while the number of households increased. (See Table 3-5). This decrease in household size continues a trend seen throughout the nation over the past twenty years. From 1970 to 1980 the number of single person households in the region grew by 43 percent. This trend continued through the 1980s, with an additional 19 percent increase in the number of single person households.

The City of Northampton, which has the largest number of households within Hampshire County, continued the national trend in decreasing size of households. The number of households in Northampton with five or more members fell from 969 in 1980 to 660 in 1990, a 32 percent decrease.

The trend toward more and smaller households (particularly single person households), and increased development in the region's rural areas, indicates increases in the total number of commuters as well as those inclined to commute alone, the number of vehicles, and the number of vehicle miles traveled. Table 3-6 shows the number of households in each community by type (family, non-family) and person size.

Another important factor in housing size is the number of dwelling units per household. The communities of the region represent a wide range of situations. In the urban areas, such as Springfield and Holyoke, there is a high density of multi-family dwellings, while some rural and suburban communities are almost exclusively single family homes. Of the total residential structures in the region, 125,812 of the units are single family and 10,755 are multi-family structures. Nearly 57 percent of the homes in the Pioneer Valley Region are single family residences. The communities of Amherst and Northampton are an exception to the pattern described above. These communities have high college student populations which result in a disproportionate concentration of multi-family homes.

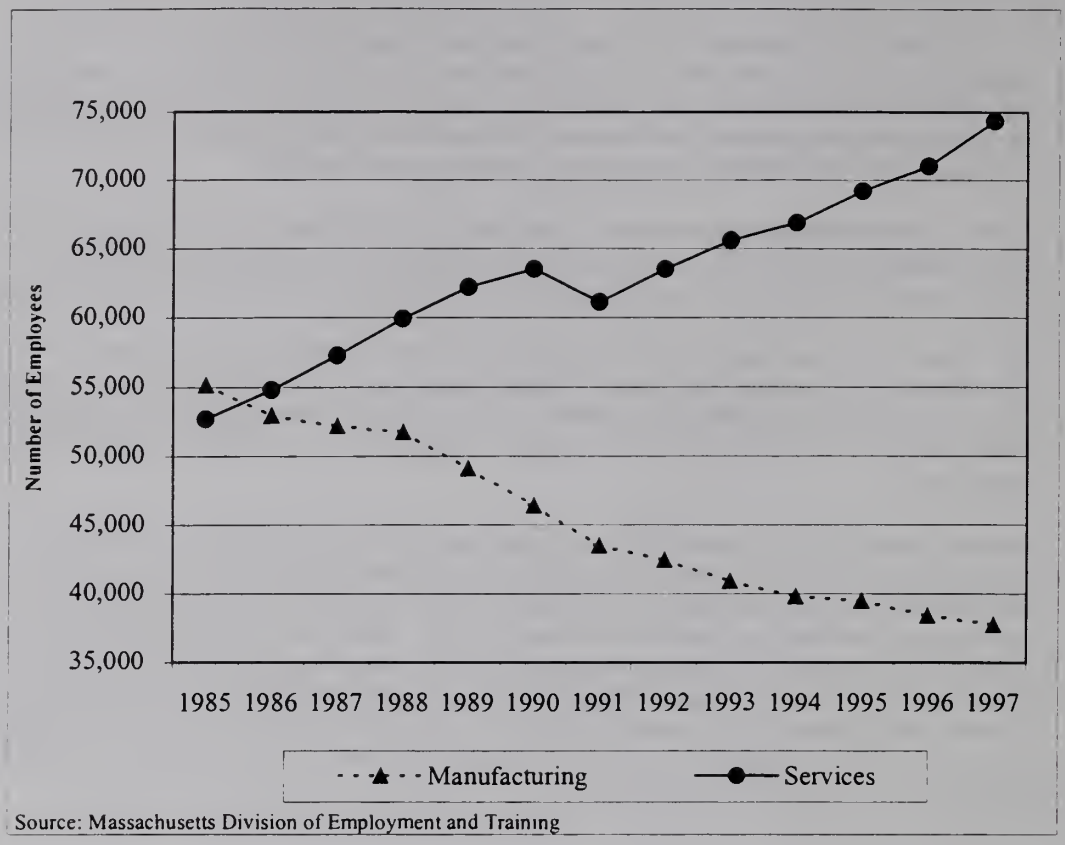
D. EMPLOYMENT

1. Type

The region's economic base continues to demonstrate the transition from the manufacturing to the service industry. Manufacturing once dominated the Valley's economy, employing over 29 percent of the work force in 1980. By 1989, one-quarter of the region's manufacturing jobs had been lost or relocated out of the Region. This trend continues in the 1990's as the number of manufacturing jobs decreased by nearly 20 percent from 1990 to 1997. At the same time service employment increased, gaining 10,846 jobs between 1990 and 1997. Today, services employ more of the region's work force than manufacturing, comprising 30 percent of total employment in 1997. Figure 3-4 shows the changes in manufacturing and service employment from 1985 to 1997, while Table 3-7 indicates employment in the region's communities by employment sector, total payroll, and average wage for 1997.

Several important implications for transportation can be derived from this information. First, the shift from primarily manufacturing jobs to high paying service jobs means that during that period the average annual income for many of the region's residents was increasing. This, in turn, improved residential flexibility and choice for those residents. Since the cost of housing in urban areas is typically less than that for suburbs or outlying areas, residents with increased incomes can afford to live outside the urban core and commute. This is clearly shown in the 1998 population estimates for the Springfield-Chicopee-Holyoke area are projected to decrease while the many of the more suburban and rural towns in Hampshire County and the suburbs in Hampden County continue to grow.

Figure 3-4 - Changes in Manufacturing and Service Employment



Source: Massachusetts Division of Employment and Training

Finally, increases in the number of two income households and the number of women in the work force indicate increases in the number of vehicles and vehicle miles traveled. Often the workers in a two income household are unable to share a commute due to the distance or time inconveniences. Therefore, the number of vehicles and miles traveled increases. In addition to more trips to and from work, the number of incidental or side trips also increases (particularly during rush hour) as children are taken to and from day care facilities, and errands are combined with the commute. Due to the need to access child care, retail and business facilities during the workday, the single occupant vehicle remains the primary choice for transportation of the region's work force. Employer-based childcare facilities could enhance the opportunity for many people to use an alternative to the single occupant vehicle. Likewise, the provision of retail and business establishments near employment centers (such as drug stores, banks, restaurants) could reduce the need for all employees to have cars in order to take care of personal business during the work day.

Table 3-7 - Pioneer Valley Regional Employment by Industrial Sector - 1997

Community	Government	Agr., Forestry, & Fishery Svcs	Mining	Construction	Manufacturing	Transp., Commun., & Publ. Utilities	Trade (Wholesale & Retail)	Finance, Insur., & Real Estate	Services	Total Employment	Average Wage
Agawam	997	95	0	552	1,540	319	2,516	241	3,676	9,936	25,375
Amherst	5,325	131		112	191	208	1,867	331	3,493	11,664	34,018
Belchertown	532	70	0	95	33	174	421	46	314	1,685	21,247
Blandford			0	3			90	0	37	150	12,624
Brimfield	90	20	0	23		42	48	18	44	388	24,597
Chester		0	0	4		0	15	0	9	89	19,012
Chesterfield	26	0	0	24		0		0	14	104	19,163
Chicopee	3,452	243		824	5,198	909	4,823	515	4,115	20,082	28,019
Cummington	51	0						0	26	132	17,184
East Longmeadow	597	72	0	238	3,839	76	1,682	202	1,762	8,468	30,235
Easthampton	489	16	0	374	1,690	54	756	132	846	4,357	26,373
Goshen	27	0	0		0		46	0	9	87	16,711
Granby	273		0	73		134	209	14	51	820	25,254
Granville	55		0	5	46	0	12	0	7	134	18,575
Hadley	485	212	0	116	56	75	1,934	304	1,014	4,196	17,067
Hampden	204	12	0	81	13		131	19	387	849	21,613
Hatfield	124	53	0	70	134	298	1,743		539	2,965	30,690
Holland			0	6	6		15		22	124	19,414
Holyoke	3,568		0	534	4,226	713	6,279	719	6,585	22,694	26,457
Huntington					13		29		35	429	23,635
Longmeadow	822		0	33		16	914	200	1,202	3,205	22,854
Ludlow	1,555			560	986	121	1,177	129	791	5,346	29,641
Middlefield			0		0	0		0		27	17,313
Monson	333	27		93	309	83	162	42	102	1,151	27,008
Montgomery		0						0		82	20,313
Northampton	3,071	93	0	291	1,288	228	4,470	455	7,433	17,329	25,660
Palmer	1,508		0	126	1,542	246	1,230	144	952	5,856	27,492
Pelham	76		0	27	0			0	7	128	20,041
Plainfield	19		0			0	0	0	14	55	14,884
Russell	63		0		118		39		11	239	38,861
South Hadley	704	20	0	207	993	20	1,032	82	1,705	4,763	28,916
Southampton	166		0	174	41		429	10	88	962	19,296
Southwick	397	127	0	67	279	15	896		278	2,195	20,787
Springfield	11,983	226	0	1,550	8,349	3,838	14,512	7,118	29,285	76,861	31,024
Tolland		0	0	0	0	0	11		27	55	10,323
Wales	73	0	0				30	0		122	15,290
Ware	354	11	0	66	712	25	760		560	2,652	26,153
West Springfield	1,108	41	0	521	2,224	1,278	5,608	982	4,743	16,505	25,850
Westfield	2,726	129	67	481	3,876	623	3,897	347	3,091	15,237	28,222
Westhampton	164			17	0	0	9	0	8	205	27,971
Wilbraham	597	50		92		116	615	112	934	3,544	30,798
Williamsburg	72		0	91	60		148		59	464	18,558
Worthington	29		0				31		68	181	21,429
Pioneer Valley Region	42,115	1,648	67	7,530	37,762	9,611	58,586	12,162	74,343	246,517	28,314

Note: When no number is reported, the data is being suppressed to preserve confidentiality. This differs from cases when a zero is reported, which indicates that there was no employment in that sector. Further, the Pioneer Valley regional total for individual sectors excludes the suppressed data. However, despite data suppression, the Total Employment column accurately reports total employment for each municipality and the region.

Source: Massachusetts Division of Employment and Training

2. Growth

Decline in jobs occurred throughout industries in the Pioneer Valley Region. Between 1980 and 1990, the Springfield-Chicopee-Holyoke area experienced a drop of 52 percent in jobs in durable goods manufacturing (metals, machinery) from 32,804 to 26,878. Jobs in the non-durable goods industry (apparel, paper, and chemicals) also dropped by 66 percent from 33,466 to 19,544. Loss of employment opportunity was not limited to the manufacturing sector. Mining jobs were terminated and government jobs slightly decreased. During the 1980s, construction jobs increased by approximately 37 percent. Service sector employment as well as transportation, communications and utilities employment increased by 45 percent and 13 percent respectively.

The Pioneer Valley Region employment is expected to increase at a very slow rate from 248,048 jobs in 1990 to 256,419 jobs in 2005. It is forecasted that the region's manufacturing jobs will continue to decline, although the rate of decline will be slow. As a whole, the region is expected to experience an increase in telecommunications, transportation and utility jobs. The Pioneer Valley Region is expected to follow the national trend in the service sector employment. Service sector employment, which includes a wide range of jobs from hotels to legal services, is projected to increase. The 2010 employment forecast figures show a 12 percent increase in the jobs in the region from 1990.

The extended forecast of employment to the year 2020 assumed that the percent change in employment from 2010 to 2020 would be equal to the percent change in the working-age population (20 to 26 years of age) as mentioned in the PVPC's Population Projections, 69. Thus, the forecasted employment change shows an increase of 1.7 percent from 272,354 in 2010 to 276,984 in 2020. Wholesale and retail employment is projected to account for 70,261 jobs, while the non-wholesale and non-retail sector is expected to account for the remaining jobs.

3. Median Household Income

As a result of the transition from the manufacturing to the service industry, the median family income for the Pioneer Valley Region continues to rise. The average median family income was calculated to be $35,531 in 1995, an increase of 12.3 percent from 1989. In Hampden County the median income increased from 1989 to 1993, but remained fairly stable from 1993 to 1995. The median income in Hampshire County grew by 11.8 percent from 1989 to 1993 and by 7.6 percent from 1993 to 1995. This information is shown on Table 3-8.

Table 3-8 - Estimated Median Household Income

	1989	1993	1995
Hampden County	31,319	34,434	34,403
Hampshire County	32,722	36,587	39,360
Pioneer Valley Region*	31,638	34,924	35,531

* Median household income for the region is a weighted average based on the number of households in 1990.

Note: This 1989 estimates differs from that reported for the 1990 census ($31,100 and $34,145, respectively) because of methodological differences.

Source: Small Area Income and Poverty Estimates Program, U.S. Bureau of the Census

CHAPTER 4

THE SEVEN FACTORS OF TEA-21

TEA-21 requires all metropolitan planning organizations to incorporate seven factors into their planning process. The Pioneer Valley MPO has taken great strides to incorporate these seven factors into the Pioneer Valley Regional Transportation Plan and the regional planning process. This Chapter addresses each factor separately and shows how the Pioneer Valley has incorporated the factor into our regional planning process.

a) Support the economic vitality of the United States, the States, and metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency.

Enhancement of the existing transportation infrastructure is vital to providing a more stable economic base and creating new consumer and business opportunities in the Pioneer Valley region. In 1994, the Pioneer Valley Planning Commission completed the "Pioneer Valley Plan for Progress: A Regional Economic Strategy for the Pioneer Valley." The Regional Plan for Progress brings together the vital economic interests of the Pioneer Valley to build a competitive regional community with a world class environment which stimulates development and growth.

The Pioneer Valley RTP promotes many strategies to enhance the economic vitality of the region. These include recommendations to revitalize the urban core, redevelop brownfield sites, and improve congested locations. By promoting projects to maintain a safe and efficient multi-modal regional transportation system, local businesses are assured of quick, reliable access to the Interstate Highway System. This facilitates easy access by employees and the efficient movement of products to and from the region.

In January of 2000, the PVPC completed There's No Place Like our Home: Windows of Opportunity to a Century of Regional Collaboration. This document coordinates the Pioneer Valley Regional Transportation Plan; Valley Vision: The Regional Land Use Plan for the Pioneer Valley; and, Pioneer Valley Plan for Progress: Economic Strategies for the Region. Each major report is summarized and specific areas are highlighted to spur interested citizens and local officials to take action and assist in the implementation of the regional strategies recommended in these documents.

The PVPC produced its first State of the Region Report in February 2000. This report identifies trends that are either improving or degrading the livability of the Pioneer Valley Region. Information on trends in community vitality, the regional economy, regional commuting trends, and environmental quality was compiled to assist our region in making wise choices to promote responsible growth in the future.

b) Increase the safety and security of the transportation system for motorized and non-motorized users.

Safety and security, particularly in public transit systems, is fast becoming a major issue throughout the nation. New system design in the Pioneer Valley has placed a premium on security at newly implemented transfer centers. These centers are well lit, include amenities, and could include quick response incident management systems in the future. The PVTA is also in the process of implementing an automated vehicle locator system that will allow the central dispatch to keep track of the entire service fleet in real time.

The Pioneer Valley Planning Commission consciously addresses the area of safety in all aspects of our transportation planning process. Recently, the PVPC completed the Route 20 Corridor Study for Westfield and West Springfield. This study was recommended by the regional congestion management system and addressed many safety issues over a corridor plagued by numerous accidents. Both short and long term recommendations were included as part of this study to reduce congestion and improve safety along this corridor.

In the fall of 2000, the PVPC will begin work on the Municipal Transportation Plan for the City of Northampton. This plan was a direct recommendation of the Safer Streets Committee formed by the City to assess the conditions "that impact the safety of bicycling, walking and driving throughout the city" and recommend a plan that would lead to measurable improvements. The plan will identify problem areas and propose recommendations to improve safety in the City. More importantly, an intensive public participation process will be used to obtain local consensus on the content and recommendations of the plan, educate the public on the transportation planning process, and promote improved zoning and subdivision regulations to enhance livability and endorse bicycling, walking and transit.

c) Increase the accessibility and mobility options available to people and for freight.

Accessibility to the regional transportation system is a high priority in the Pioneer Valley. The Pioneer Valley Regional Congestion Management System proposes improvement alternatives to maintain convenient access to the regional highway system, and maintain the efficient mobility of vehicles in the region. The Pioneer Valley Transit Authority (PVTA) provides wheelchair lifts on all of their fixed route transit vehicles and provides bicycle racks on many buses in the Five College area. Strategies to promote and enhance pedestrian and bicycle travel throughout the region are included as part of the Pioneer Valley Regional Bicycle and Pedestrian Transportation Plan.

The efficient movement of freight is a high priority in the Pioneer Valley Region. Representatives from local freight carriers are included as part of the Pioneer Valley Joint Transportation Committee and their needs are addressed as part of the RTP. The movement of freight is also considered in the planning and design of local projects such as the Route 10/202 Great River Bridge project in Westfield. A large component of this project consists of the elevation of an existing railroad viaduct to facilitate the movement of freight along the Route 10/202 corridor.

d) Protect and enhance the environment, promote energy conservation and improve the quality of life

Travel demand management initiatives, land use strategies, and non-motorized transportation programs are all included in the RTP and will play a vital role in promoting energy conservation efforts in the region. The PVTA is currently in the process of purchasing alternative fuel vehicles and the regional long-range strategies include the continuation of these efforts.

Improvements in technology have been successful lowering the level of pollution emitted by individual vehicles. This in combination with projects to reduce traffic congestion, improve intersection levels of service, and reduce the number of single occupant vehicle trips can improve the air quality in the region. The RTP focuses on both supply-side strategies such as travel demand management, traffic control measures and use of alternate modes of transportation and demand-side strategies such as stronger land use regulations to comply with the Clean Air Act Amendments in the Pioneer Valley.

The Pioneer Valley Planning Commission incorporates the strategies and recommendations of the Regional Transportation Plan into future versions of the Regional Transportation Improvement Program and the Unified Planning Work Program. Through the advancement of projects and

studies of regional importance in combination with a strong public participation process it is hoped that an improvement in the quality of life in the Pioneer Valley can be realized.

e) Enhance the integration and connectivity of the transportation system, across and between modes throughout the State, for people and freight.

The Pioneer Valley transportation planning process focuses on new and innovative ways to enhance the integration and connectivity of the regional transportation system. The revitalization of Union Station in Springfield is a perfect example of a regional project to improve the connectivity between transportation modes. Union Station will be the new regional intermodal transportation center providing access to public transit, private bus companies, and passenger rail. The downtown Springfield location has convenient access to the Interstate Highway System, ample parking at local garages, as well as convenient pedestrian access.

The Pioneer Valley Planning Commission is currently working with the Capital Region Council of Governments on a study to maintain efficient access to the Bradley International Airport in Windsor Locks, CT. A large component of this study is the ability for freight carriers to efficiently access the airport from the Pioneer valley region.

The Pioneer Valley RTP in combination with the Pioneer Valley Non-Motorized Plan promotes strategies to encourage people to bicycle or walk as an alternative to making a trip by car. Recommendations include providing bicycle racks at retail centers and places of employment, increasing the connectivity of the local sidewalk system between major activity centers, and expansion of the PVTA "Rack and Roll" bicycles on transit system.

f) Promote efficient system management and operation.

The Pioneer Valley Planning Commission utilizes the 3C (Comprehensive, Continuing, Cooperative) Transportation Planning Process for all transportation planning in this region. Public participation is included at all stages of the transportation planning process so that recommendations can be reflective of local needs and responsible to citizens' desires.

Previously programmed transportation facilities and construction improvements are re-evaluated to determine changing regional transportation needs, priorities and long range considerations before including such projects in the RTP. The Pioneer Valley regional transportation model is utilized to evaluate long-range projects to determine their impact on congestion and air quality in the region.

The planning and development of transportation facilities and services in the Pioneer Valley is coordinated with adjoining Regional Planning Agencies such as the Berkshire Regional Planning Commission (BRPC), Franklin Regional Council of Governments (FRCOG), Central Massachusetts Regional Planning Commission (CMRPC), and the Capitol Region Council of Governments (CRCOG) in Hartford, Connecticut. Traffic counts performed along the regional borders are shared with the neighboring region. In addition, neighboring regions are invited to participate in transportation planning activities of interest. Recently, representatives from both CMRPC and CRCOG participated in the ITS Strategic Deployment Plan for the PVPC region. The PVPC is currently involved in a study of the Bradley International Airport in Windsor Locks, CT with CRCOG.

g) Emphasize the preservation of the existing transportation system.

Preserving and maximizing the efficiency of the transportation infrastructure has been identified as a high priority in the Pioneer Valley Planning process. A regional pavement management system has been in place in the Pioneer Valley since 1993 to ensure that federal-aid eligible roadways are

maintained in the most cost effective and efficient manner. In addition, many communities in the region have enlisted planning commission assistance to establish a local pavement management system in order to efficiently maintain all community roadways.

Another form of infrastructure preservation consists of the efforts within the region to preserve abandoned rail corridors and toe path canal beds. These right of ways are maintained for future non-motorized transportation uses. The Norwottuck Rail Trail, Connecticut Riverwalk and the Manhan Rail Trail are all examples of projects that reuse existing transportation rights of way in the region.

The Intelligent Transportation Systems Strategic Deployment Plan for Metropolitan Springfield and the Pioneer Valley Region identifies strategies to establish a regional architecture of intelligent transportation system (ITS) technology. It is hoped that future expansion of our regions highways will be minimized by the use of ITS technology in the region.

CHAPTER 5

REGIONAL VISION AND GOALS

The Pioneer Valley Planning Commission developed a vision statement consistent with the seven areas of TEA-21 and which provided a framework for our RTP.

VISION STATEMENT

The Pioneer Valley region strives to create and maintain a safe, dependable, and environmentally sound transportation system that promotes livable communities, provides for the efficient movement of people and goods, and advances the economic vitality of the region.

A. REGIONAL GOALS

Safety	To provide and maintain a transportation system that is safe for all users and their property.
Operations	To provide and maintain a transportation system that is dependable and adequately serves users of all modes.
Environmental	To minimize the transportation related adverse impacts to air, land, and water quality and strive to improve environmental conditions at every opportunity.
Coordination	To collaborate the efforts of the general public with local, state and federal planning activities including project implementation, land use and economic development.
Energy Efficient	To promote the reduction of energy consumption through demand management techniques and increase the use of energy efficient travel modes.
Cost Effective	To provide a transportation system that is cost effective to maintain, improve and operate.
Intermodal	To provide access between travel modes for people and goods while maintaining quality and affordability of service.
Multimodal	To provide a complete choice of adequate travel options that are accessible to all residents, visitors and businesses
Economically Productive	To maintain a transportation system that promotes and supports economic stability and expansion.
Quality of Life	To provide and maintain a transportation system that enhances quality of life and improves the social and economic climate of the region.

CHAPTER 6

DEVELOPMENT OF THE PLAN

The development of a long-range transportation plan requires the involvement of many different people and agencies to consider many all modes of transportation and their subsequent short and long range needs. Much of this work is performed through ongoing transportation planning tasks conducted as part of the Pioneer Valley Unified Transportation Work Program. The following summarizes these activities and their role in the RTP.

A. PIONEER VALLEY PUBLIC PARTICIPATION PROCESS

The role of public participation should evolve into an avenue for working with residents and employers of the region to collaboratively build transportation programs. The Pioneer Valley is diverse in its demographics, economics and geography, resulting in varying transportation needs across the region. Finding effective avenues for reaching over 600,000 residents of forty-three communities in the Valley requires creativity and resources.

For the transportation planning process to be successful within the Pioneer Valley region, broad public involvement is needed. Traditionally, Pioneer Valley transportation plans and programs have been developed by involved agencies with community representation and then presented to the general public. The degree of public interaction and participation has been limited. Incorporating the ideas and interests of citizens has required a new approach to developing transportation plans. Citizens must be involved early on and continue participating throughout the process.

Much of the early participation for the RTP was accomplished through the development of other plans, programs, and studies. Corridor studies, management systems, land use plans and initiatives were all predicated upon the involvement of local elected officials and their constituencies. Public hearings and meetings for these activities are a prime source of ideas that are expanded while developing the RTP.

In addition to the outreach associated with these activities, the Pioneer Valley Joint Transportation Committee (JTC), the transportation advisory group for the region, plays a vital role in the development of the RTP. The JTC was established by the 3C Memorandum of Understanding, which emphasizes a comprehensive, cooperative and continuing process for transportation planning and programming. The JTC incorporates citizen participation into this commitment and was formed to represent both public and private interests in the region. It consists of individuals from local, regional and state government and private groups and individuals who provide transportation facilities, services or planning for the Pioneer Valley region. The JTC is also charged with the coordination of all transportation-related projects throughout the planning district. The planning program and the various functional elements of the planning process must be reviewed by the JTC prior to action by the Metropolitan Planning Organization (MPO).

The development of the 2000 Update to the RTP will continue to rely upon participation from the public. It is envisioned that four public forums will be held to discuss transportation issues with interested citizens, city councilors, local planners, and business leaders across the region. In addition, the PVPC will seek out other interested public organizations that might have interest in the development of the RTP. The draft document will be presented at selected regional meetings and events to obtain additional input from the public.

B. PIONEER VALLEY CONGESTION MANAGEMENT SYSTEM

The Congestion Management System (CMS) is an ongoing transportation planning activity directed at maximizing the mobility of people and goods. The CMS accomplishes this goal through a variety of tasks which identify existing and projected locations with traffic congestion and develops strategies to alleviate and better manage traffic operations in these problem areas. Congested locations are typically characterized by excessive travel delay, large vehicle queues and traffic bottlenecks causing driver frustration and poor traffic operations. The CMS evaluates the existing federal aid transportation system performance and proposed strategies to aid in project and strategy implementation. Products of the CMS are suggested projects and strategies that increase the mobility of people and goods through improvements to the transportation infrastructure and changes to travel behavior. The CMS serves as a guide and technical support for local, regional and state officials in making decisions related to investments in congestion relief projects and programs in a specific area.

C. PIONEER VALLEY PAVEMENT MANAGEMENT SYSTEM

A Pavement Management System (PMS) is a systematic process that collects and analyzes roadway pavement information for use in selecting cost-effective strategies for providing and maintaining pavements in a serviceable condition. The PMS is developed in cooperation with the Metropolitan Planning Organizations (MPO) and other entities (like communities) receiving federal highway or transit funds. The PVPC's regional PMS involves a comprehensive process for establishing the network inventory and project histories, collecting and storing the pavement distress data, analyzing the data, identifying the network maintenance activities and needs and integrating the PMS information into the metropolitan and statewide planning processes. The roadway network covered by the regional PMS includes all urban and rural federal-aid highways of the 43 cities and towns in the region.

D. VALLEY VISION – PIONEER VALLEY REGIONAL LAND USE PLAN

This RTP emphasizes the connection between transportation and land use, with substantial effort placed on a "land use management system." Valley Vision is the regional land use plan for the Pioneer Valley. It is designed to help communities plan effectively to control sprawling growth and promote a more compact development pattern in order to preserve the region's quality of life. Valley Vision consists of three key parts:

- A regional land use map.
- Detailed land use strategies and model bylaws.
- A "delivery system of technical assistance and services to help communities implement the plan.

Valley Vision is intended to provide meaningful guidance to the communities of the Pioneer Valley region in developing regionally-consistent local master plans and zoning bylaws, and in making other land use growth decisions. The plan includes an implementation strategy that provides communities with detailed guidance on how to put Valley Vision into action.

E. PIONEER VALLEY REGIONAL TRANSPORTATION MODEL

Developing a long-range transportation plan requires the foresight to forecast the future performance of the transportation system. This projection is best accomplished through the use of a transportation demand model. A network of all major roadways in the Pioneer valley region is developed and traffic volumes are generated based on population and employment data for the region. Typically, this is done for a "base" year for which this information is readily available. In the 2000 update to the RTP, the base year has been changed from 1990 to 1997. Future networks are developed and include

scheduled roadway improvement projects and other projects designated as "regionally significant." Projections are developed to estimate future population and employment data, and new traffic volumes generated for each future analysis year.

The regional transportation model is used as a tool in many aspects of RTP development, primarily, system deficiency identification, major improvement alternative analysis, and air quality conformity analysis. By simulating the effect of currently proposed improvement projects, the model indicates how the system performs after implementation. Potential new problem areas are identified and incorporated into the management systems and the RTP. Project priorities resulting from the management system analysis and local input are tested for viability with the regional transportation model. Once the effects of the newly planned improvements are simulated, the total vehicle miles of travel are calculated for the entire region and an estimate of vehicle emissions can be made.

F. INTELLIGENT TRANSPORTATION SYSTEMS STRATEGIC DEPLOYMENT PLAN FOR THE METROPOLITAN SPRINGFIELD AND PIONEER VALLEY REGION

In January of 1997, the BTP&D with the cooperation of the PVPC, solicited the assistance of a consultant to conduct an Intelligent Transportation Systems (ITS) Early Deployment Plan (EDP). The project was completed in September of 1998 and consists of a plan of recommended ITS strategies and applications for the Pioneer Valley.

The strategic plan prioritizes 18 specific ITS projects for the Pioneer Valley. Top priority projects such as the installation of an Advanced Traffic Management System for the Calvin Coolidge Bridge and Route 9, the implementation of "smart-card" technology for PVTA buses, and the development of an Incident Management Coalition for the region are already underway. Additional projects and strategies will be incorporated into the 2000 update of the RTP as well as future updates to the RTP. The deployment of ITS will provide an integrated transportation management capability to enhance traveler safety, provide up to date travel information, mitigate traffic congestion, and achieve coordinated response to transportation operational problems in the Pioneer Valley region.

G. ACCESS TO JOBS PROGRAM FOR THE PIONEER VALLEY

The Welfare Reform Act of 1996 mandated a concerted effort to move individuals off welfare and into work. This requires many major barriers to be addressed and overcome to assure the level of mobility required to transport welfare recipients to and from job opportunities which exist in urban, suburban and outlying rural areas in ways that are convenient, efficient, affordable and reliable. The specific needs and circumstances of the Pioneer Valley have been identified and are currently being implemented to respond to the needs of welfare recipients who live in the Pioneer Valley. In turn, it is hoped that the regional economy, the region's workforce, and its current and future workforce can be fortified.

H. PIONEER VALLEY REGIONAL BICYCLE AND PEDESTRIAN TRANSPORTATION PLAN

In February of 2000 the Pioneer Valley Metropolitan Planning Organization adopted and endorsed the Pioneer Valley Regional Bicycle and Pedestrian Transportation Plan. The strategic plan identifies a "vision statement" for bicycling and walking and outlines goals and objectives for achieving this vision. The "Bike and Ped Plan" includes 33 specific implementation action items that directly impact bicycling and walking. Each of these 33 action items identifies an implementation agent and a timetable for action. Where applicable, the action items are incorporated into specific work tasks in the PVPC Unified Transportation Planning Work Program (UPWP). Action items include; improving

transit access for bicyclists, implementing traffic calming measures on neighborhood streets, encouraging bicycling and walking through activities and programs like the "Pioneer Valley Bike to Work Week." The action items provide an integrated approach by addressing engineering, enforcement, and encouragement initiates. (three E's)

CHAPTER 7

EXISTING TRANSPORTATION SYSTEMS

A. HIGHWAY

1. Access

The Pioneer Valley area is considered the crossroads of transportation in Western Massachusetts. Situated at the intersection of the area's major highways, Interstate 90 (Massachusetts Turnpike) traveling east-west and Interstate 91 traveling north-south, the region offers easy access to all markets in the Eastern United States and Canada. Major southern New England population centers are accessible within hours.

Table 7–1 - Driving Distance and Time from Springfield

Destination	Distance	Time
Albany	85 miles	1.5 hours
Boston	91 miles	1.5 hours
Montreal	301 miles	5.5 hours
New York City	140 miles	3.0 hours
Philadelphia	260 miles	5.0 hours
Washington	400 miles	8.0 hours

The interstate expressways (I-90/I-91) link most of the major urban centers in the region. The basic highway network including interstate highways, U.S. numbered routes and state routes, along with other traffic arteries, provides access to all municipalities in the region, both urban and rural. The pattern of principal arterial highways in the region is radial, extending outwards from each of the region's major centers, a consequence of development and topographic influences.

Table 7-2 – Regional Interstate Highways

Interstate Highways	Principal Orientation	# of In- Region Interchanges	In-Region Mileage	Toll Road?
I-90	East/West (Mass. Turnpike)	6	46.08	Yes
I-91	North/South	22	31.17	No
I-291	Connector (Springfield to I-90)	6	5.44	No
I-391	Connector (I-91 to Chicopee/Holyoke)	6	3.82	No

The highway network is composed of various facilities that are separated into systems within the federal-aid highway program by the Massachusetts Highway Department on the basis of their functional classification which takes into account the various functions and uses of the roads. The federal-aid highway program in Massachusetts is a state-administered program. The program consists of three separate federal aid systems, the National Highway System (NHS), the Interstate System and the Surface Transportation Program.

2. Functional Classification

The Federal-Aid Highway Act of 1973 required the use of functional highway classification to update the Federal-Aid Highway system and identify the National Highway System. Both of these highway systems are used as inventory mechanisms and funding eligibility criteria for our nation's roadway network.

In 1992, the PVPC, under the direction of the Massachusetts Highway Department (MHD), began the reclassification process to update the federal-aid network in the Pioneer Valley Region. The regions roadways were grouped into classes according to the service they are intended to provide.

The seven functional classifications adopted by Massachusetts are summarized below:

Interstate - Freeways service as principal arterials providing service to substantial statewide and interstate travel.

Rural Principal Arterials and Urban Extensions - Major highways that serve corridor movements having trip length and travel density characteristics that indicate substantial statewide or interstate travel. Principal Arterials include the Interstate system.

Rural Minor Arterial and Urban Extensions - Roadways with statewide significance that link cities and large towns form an integrated network of intracounty importance.

Rural Major Collectors and Urban Minor Arterials - Those roads that provide service to cities, towns and other traffic generators not served by the arterial system; roads that link these places with the arterial system; and roads that serve the more important intracounty travel corridors.

Rural Minor Collectors and Urban Collectors - Roads that bring traffic from local roads to collector roads; roads that provide service to small communities and link local traffic generators to the rural areas.

Local Roads - Roads that provide access to adjacent land; roads that provide service to relatively short distances. Local roads include all roads not classified as part of the principal arterial, minor arterial, or collector system.

Other Urban Principle Arterials - Roadways with significance that service access to and within the urbanized area. Connections to interstate and rural principle arterials is typical.

After local and state reviews, a final federal-aid network was completed for the Pioneer Valley Region. Table 7 - 3 summarizes the roadway mile by functional classification for each community. The functional classification of a roadway may be upgraded or downgraded based on changes in land use, population, and vehicular volume. Communities can request a change in the functional classification through a written request to the PVPC. If PVPC concurs, that a change is warranted, the request is submitted to MassHighway Planning for their approval. Once approved by MassHighway, the change requires endorsement by both the MPO and the FHWA before the functional classification can be officially changed.

In the fall of 1998, the new relocated Route 57 was classified as an Urban Extension of a Rural Minor Arterial. Several surrounding roadways were reclassified as follows: South Westfield Street from Route 57 to its intersection with Springfield Street was changed from an Urban Minor Arterial to an Urban Extension of a rural Minor Arterial.

Table 7-3 - Miles of Roadway by Community and Functional Classification

Community	Functional Classification						
	Total	Interstates	Principal Arterials	Minor Arterials	Major Collectors	Minor Collectors	Local Roads
Agawam	150.2	0.0	29.3	0.0	27.6	0.0	93.3
Amherst	135.8	0.0	36.9	2.9	5.0	6.9	86.7
Belchertown	152.9	0.0	23.8	23.8	0.0	27.7	101.4
Blandford	89.3	8.5	8.6	8.6	0.0	25.0	47.3
Brimfield	79.5	2.9	8.8	8.8	0.0	17.1	50.6
Chester	65.8	0.0	8.2	8.2	0.0	17.4	40.2
Chesterfield	58.2	0.0	7.8	7.8	0.0	15.6	34.9
Chicopee	260.5	11.2	39.6	0.0	15.5	0.0	194.1
Cummington	61.7	0.0	13.1	13.1	0.0	9.4	39.2
East Longmeadow	93.9	0.0	21.4	0.0	9.4	0.0	63.2
Easthampton	88.4	0.5	25.0	0.0	5.0	0.0	58.0
Goshen	43.9	0.0	5.4	5.4	0.0	8.3	30.2
Granby	67.5	0.0	16.6	5.6	1.3	17.1	32.4
Granville	73.8	0.0	9.0	9.0	0.0	20.3	44.4
Hadley	83.2	0.0	18.5	4.5	3.5	15.7	45.4
Hampden	53.7	0.0	5.8	0.0	16.1	7.2	38.1
Hatfield	59.0	3.7	0.0	0.0	0.0	14.5	40.7
Holland	37.1	0.1	0.0	0.0	0.0	11.6	25.4
Holyoke	168.9	9.9	38.1	0.0	19.8	0.0	101.1
Huntington	54.4	0.0	11.2	0.0	0.0	7.1	36.1
Longmeadow	98.4	3.3	14.2	0.0	5.0	0.0	76.0
Ludlow	129.2	5.9	21.3	0.0	8.0	7.5	86.6
Middlefield	38.4	0.0	0.0	0.0	0.0	7.5	30.9
Monson	112.5	0.0	8.7	8.7	0.0	25.5	78.3
Montgomery	30.8	0.1	0.0	0.0	0.0	8.3	22.4
Northampton	182.3	6.1	48.4	0.0	16.1	0.0	111.7
Palmer	114.4	7.6	16.5	16.5	0.0	32.2	58.1
Pelham	45.8	0.0	5.8	5.8	0.0	11.0	29.0
Plainfield	48.8	0.0	0.0	0.0	0.0	17.7	31.1
Russell	36.1	4.0	9.5	9.5	0.0	6.4	16.2
South Hadley	102.3	0.0	18.0	0.2	10.3	0.0	74.0
Southampton	74.1	0.0	10.9	0.0	4.2	4.4	54.7
Southwick	76.5	0.0	18.7	3.0	6.0	10.0	41.8
Springfield	498.7	9.6	103.0	0.0	47.7	0.0	338.4
Tolland	42.6	0.0	5.7	5.7	0.0	5.4	31.5
Wales	28.8	0.0	0.0	0.0	0.0	13.4	15.4
Ware	117.0	0.0	18.7	5.6	5.3	9.1	83.9
West Springfield	143.4	6.3	30.7	0.0	9.1	0.0	97.3
Westfield	236.1	6.7	46.3	0.0	20.4	0.0	162.8
Westhampton	48.5	0.0	0.0	0.0	0.0	22.4	26.2
Wilbraham	111.5	1.1	17.8	1.2	12.4	7.1	73.1
Williamsburg	50.1	0.0	9.3	6.9	0.0	12.9	27.5
Worthington	64.3	0.0	10.3	10.3	0.0	10.6	43.4
Pioneer Valley Region	**4,308.0**	**87.2**	**740.9**	**171.2**	**247.5**	**432.4**	**2,813.0**

Source: MassHighway
fcrtp.xls

3. Jurisdiction

There are over 4,300 miles of road in the region. As of 1998, city and town governments administered 77 percent of the road miles and the Massachusetts Highway Department (MassHighway) was responsible for seven percent. The Massachusetts Turnpike Authority, the Metropolitan District Commission, the Federal Government, various park systems and the state colleges and universities administered a small number of roadway miles. Table 7-4 gives an inventory of the region's roadway miles according to the governmental unit responsible for maintaining them.

4. Bridges

Among the existing transportation facilities in the Pioneer Valley Region major bridge crossings remain a focal point for regional transportation concerns, as many streets and highways converge into a limited number of crossings over the Connecticut, Westfield and Chicopee Rivers. Table 7-5 lists the bridges by community according to the governmental unit responsible for maintaining them.

All of the bridges throughout the state undergo routine structural inspection. Using a generally accepted rating system developed by the American Association of State Highway and Transportation Officials (AASHTO), MassHighway surveyed and rated the state bridges. This process identified bridges that are structurally sufficient, functionally obsolete and structurally deficient. Figure 7-1 summarizes the status of bridge conditions within the Pioneer Valley Region.

A bridge is classified functionally obsolete when deck geometry, local capacity, clearance or alignment of the approach roadway no longer meets the usual criteria for the highway it serves. A bridge is classified structurally deficient when the structural scores are below the acceptable sufficiency rating. Sufficiency rating is a function of the structural adequacy and safety, functional obsolescent and serviceability of a bridge. Eleven percent of the region's bridges were rated structurally deficient. This is a three percent decrease from 1993 when fourteen percent of the region's bridges were rated structurally deficient.

Table 7-4 - Miles of Roadway by Community and Administrative Unit

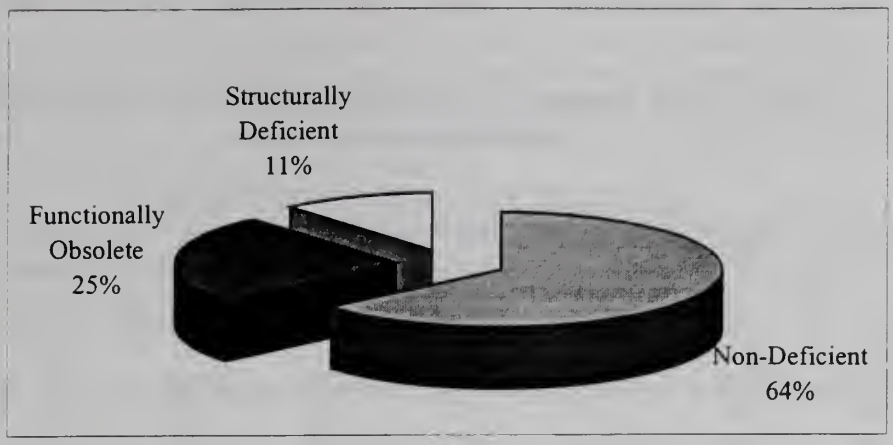
Community	Total	MHD	City/ Town	MDC	MTA	Forests &Parks	Inst./ College	County	Private	Federal
Agawam	150.2	14.3	89.5	0.0	0.0	3.9	0.0	0.0	42.4	0.0
Amherst	135.6	9.1	96.1	0.0	0.0	0.0	7.7	0.0	0.0	0.0
Belchertown	152.9	15.4	111.7	7.6	0.0	0.0	2.7	0.0	15.6	0.0
Blandford	89.3	9.7	63.1	0.0	8.5	3.6	0.0	0.0	4.5	0.0
Brimfield	79.5	12.2	64.3	0.0	2.9	0.0	0.0	0.0	0.1	0.0
Chester	65.8	6.6	58.1	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Chesterfield	58.2	0.1	53.3	0.0	0.0	0.2	0.0	0.0	4.7	58.2
Chicopee	260.5	12.7	151.1	0.0	6.7	1.2	0.0	0.0	73.0	15.8
Cummington	61.7	9.9	49.1	0.0	0.0	0.0	0.0	0.0	1.9	0.8
East Longmeadow	93.9	0.0	90.7	0.0	0.0	0.0	0.0	0.0	3.2	0.0
Easthampton	88.4	3.0	79.5	0.0	0.0	2.4	0.0	0.0	3.6	0.0
Goshen	43.9	7.2	26.0	0.0	0.0	5.0	0.0	0.0	5.7	0.0
Granby	67.5	7.7	56.7	0.0	0.0	0.0	0.0	0.0	2.9	0.2
Granville	73.8	0.0	64.6	0.0	0.0	1.2	0.0	0.0	7.9	0.0
Hadley	83.2	8.1	67.0	0.0	0.0	1.2	3.5	0.0	3.4	0.0
Hampden	53.7	0.0	52.1	0.0	0.0	0.0	0.0	0.0	1.6	0.0
Hatfield	59.0	7.4	50.7	0.0	0.0	0.0	0.0	0.1	1.0	0.0
Holland	37.1	0.9	35.1	0.0	0.0	0.0	0.0	0.0	1.9	0.0
Holyoke	168.9	17.0	125.9	0.0	0.0	5.0	1.8	0.0	19.2	0.0
Huntington	54.4	11.8	37.1	0.0	0.0	0.0	0.0	0.0	1.8	3.7
Longmeadow	98.4	3.3	84.7	0.0	0.0	0.0	0.0	0.0	10.5	0.0
Ludlow	129.2	0.0	100.7	0.1	6.1	0.3	0.0	0.0	22.0	0.0
Middlefield	38.4	0.0	38.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Monson	112.5	7.1	100.7	1.2	0.0	0.0	0.6	0.0	2.6	0.3
Montgomery	57.5	0.0	47.9	0.0	0.0	4.2	0.0	0.0	5.4	0.0
Northampton	182.3	13.8	150.5	0.0	0.0	0.0	3.8	0.8	11.8	1.6
Palmer	114.4	15.6	86.7	0.0	7.6	0.0	0.0	0.0	4.5	0.0
Pelham	45.8	5.7	22.7	14.7	0.0	0.8	0.0	0.0	2.0	0.0
Plainfield	48.8	0.0	47.9	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Russell	36.1	9.5	22.6	0.0	4.0	0.0	0.0	0.0	0.0	0.0
South Hadley	102.3	9.5	75.1	0.0	0.0	0.6	0.0	0.0	17.0	0.0
Southampton	74.1	5.4	64.9	0.0	0.0	0.0	0.0	0.0	3.8	0.0
Southwick	76.5	7.2	61.0	0.0	0.0	0.0	0.0	0.0	8.3	0.0
Springfield	498.7	11.6	394.6	0.0	0.0	0.0	1.4	0.0	91.0	0.0
Tolland	42.6	0.2	40.2	0.0	0.0	2.3	0.0	0.0	0.0	0.0
Wales	28.8	5.1	23.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ware	117.0	11.3	84.4	17.1	0.0	0.0	0.0	0.0	4.3	0.0
West Springfield	143.4	11.9	115.1	0.0	3.3	0.0	0.0	0.0	13.2	0.0
Westfield	236.1	9.4	171.4	0.0	6.9	0.0	0.4	0.0	48.1	0.0
Westhampton	48.5	0.0	43.9	0.0	0.0	0.0	0.0	0.0	4.6	0.0
Wilbraham	111.5	5.1	92.0	0.0	1.1	0.0	0.0	0.0	13.4	0.0
Williamsburg	50.1	5.7	41.4	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Worthington	64.3	5.9	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0
Pioneer Valley Region	**4334.47**	**295.9**	**3,331.9**	**40.6**	**47.0**	**33.3**	**22.0**	**0.9**	**460.6**	**80.6**

MHD = Massachusetts Highway Department
MDC = Metropolitan District Commission
MTA = Massachusetts Turnpike Authority
Source: Massachusetts Highway Department, Road Inventory Data File, 12/31/90

Table 7-5 - Number of Bridges by Community and by Administrative Unit

Community	Total	MHD	City/ Town	MTA	Parks and Forests	Private	Military	Other State
Agawam	18	17	1					
Amherst	15	6	9					
Belchertown	12	5	7					
Blandford	11	2	5	4				
Brimfield	26	4	16	6				
Chester	23	7	15		1			
Chesterfield	9	3	6					
Chicopee	50	24	5	20				1
Cummington	12	7	5					
East Longmeadow	1	1						
Easthampton	19	9	10					
Goshen	4	2	2					
Granby	8	1	7					
Granville	9	3	6					
Hadley	10	6	4					
Hampden	8		8					
Hatfield	15	10	5					
Holland	1		1					
Holyoke	49	40	9					
Huntington	6	5	1					
Longmeadow	4	4						
Ludlow	22	1	7	14				
Middlefield	8		8					
Monson	23	9	14					
Montgomery	5		4	1				
Northampton	44	23	21					
Palmer	31	7	8	16				
Pelham	3		3					
Plainfield	2		2					
Russell	15	7	4	4				
South Hadley	11	7	4					
Southampton	10	2	8					
Southwick	3	2	1					
Springfield	60	46	13		1			
Tolland								
Wales	1		1					
Ware	16	7	8					1
West Springfield	26	17	2	7				
Westfield	35	12	11	12				
Westhampton	14	1	13					
Wilbraham	4	1	2	1				
Williamsburg	16	7	9					
Worthington	14	5	9					
Total:	**673**	**310**	**274**	**85**	**2**	**0**	**0**	**2**

Figure 7-1 – Bridge Conditions Categories for the Pioneer Valley



5. Safety

MassHighway publishes a summary report which lists the top 1000 accident locations within the state. The most recent data available at the time of publishing was from the 1994-1996 MassHighway Report. The accident locations are ranked based on the number of accidents and weighted by the severity of the accident. Fatalities and accidents involving a personal injury are given more weight than accidents only involving property damage. Each year a number of Pioneer Valley Region locations are identified in the listing. Table 7-6 lists the highest accident locations in the Pioneer Valley compiled from a three-year state inventory of accidents.

Table 7-6 - High Accident Locations in the Pioneer Valley

Community	Location	Intersecting Street	Regional ranking
Springfield	Boston Road	Parker Street	1
Hadley	Russell Street	Middle Street	2
Northampton	Damon Road	Bridge Street	3
Agawam	Route 5	Henry E. Bodurtha Highway	4
Holyoke	Sargeant Street	Maple Street	5
East Longmeadow	Shaker Road	Maple Street	6
Holyoke	Appleton Street	Beech Street	7
Holyoke	Appleton Street	Maple Street	8
Westfield	Elm Street	Franklin Street	9
Northampton	Damon Road	King Street	10
Springfield	Sumner Avenue	Belmont Avenue	11
Holyoke	Cabot Street	Main Street	12
Springfield	Roosevelt Avenue	Bay Street	13
Northampton	Bridge Road	Hatfield Street	14
Amherst	Meadow Street	Route 116	15

6. Vehicle Miles Traveled

In general, traffic on the region's roadways has been increasing. Between 1980 and 1998 the estimated number of daily vehicle miles traveled (DVMT) in the Springfield-Chicopee-Holyoke urbanized area rose from 7.4 million to 10.7 million. The magnitude of increase is shared in the region's rural areas as

well. Table 7-7 presents the Pioneer Valley's estimated urban VMT by functional class for the year 1980 through 1990. Information on the changes in total VMT from 1990 – 1998 is shown on Figure 7-2.

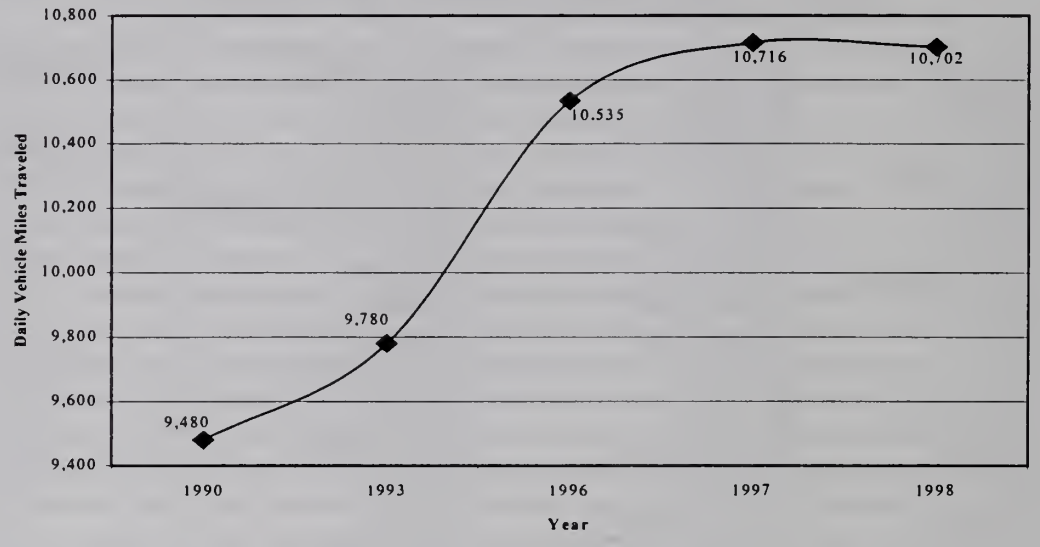
Table 7-7 - 1980 - 1998 Estimated Urban Vehicle Miles of Travel in the Pioneer Valley Urbanized Area

Daily Vehicle Miles Traveled (DVMT in thousands)							
Year	**Total**	Interstate	Other Principal Arterial	Urban Minor Arterial	Urban Arterial	Urban Collector	Urban Local
1980	**7,466**	1,844	187	2,570	1,521	494	850
1981	**7,619**	1,893	176	2,642	1,547	513	848
1982	**7,801**	1,974	168	2,732	1,558	515	854
1983	**7,848**	1,912	190	2,819	1,557	515	855
1984	**8,060**	2,085	191	2,857	1,557	515	855
1985	**8,026**	2,024	192	2,868	1,569	518	855
1986	**8,126**	2,204	208	2,785	1,551	524	854
1987	**8,359**	2,279	227	2,916	1,553	530	854
1988	**8,760**	2,430	295	2,658	1,829	694	854
1989	**9,439**	2,531	301	2,746	1,852	711	1,298*
1990	**9,480**	2,429	295	2,774	1,979	688	1,315*

Note: The methodology for estimating travel on functional class Local roadways was changed in 1989. Comparisons with previous years are not valid. uvmt.xls

Source: Massachusetts Highway Department, Highway Performance Monitoring System.

Figure 7-2 – Urban Daily Vehicle Miles Traveled



The increase in VMT is the resultant of several major trends identified in the Pioneer Valley as well as other areas of the state and nation. Vehicle ownership is on the rise as vehicle occupancy rates decline. Generally speaking, this puts more single occupant vehicles on the roadway system, thus, increasing the total vehicle miles of travel daily.

7. Average Daily Traffic Counts

The Pioneer Valley Planning Commission (PVPC) monitors traffic levels throughout the Region. Conducting close to 120 roadway segment counts annually as well as compiling counts from various local traffic studies; the PVPC continuously expands the data base. This information is used to measure Average Daily Traffic (ADT), Daily Vehicle Miles Traveled (DVMT), and identify seasonal, daily and hourly trends related to vehicle travel.

In addition to the selective ground counts conducted throughout the region, there are six permanent monitoring stations maintained by MHD as well as four such stations maintained by PVPC. The MHD locations collect counts hourly, 365 days a year. The PVPC locations collect counts hourly, 7 days a month. These permanent count locations are shown in Table 7-8.

Table 7-8 - Mass Highway Permanent Count Stations in the Pioneer Valley

Community	Roadway	Location
Longmeadow	I-91	South of the Springfield City Line
Springfield	I-291	South of Roosevelt Avenue
Chicopee	I-391	South of I-90 at Route 116
Chicopee	I-391	North of I-90
Northampton	Route 5/10	South of the Hatfield Town Line
West Springfield	Route 5	At the Holyoke City Line
Huntington	Route 112	South of Route 66/112

Source: Massachusetts Highway Department

By examining the change in traffic volumes at the permanent count stations, information can be developed on the amount of growth occurring at specific locations throughout the region. Locations have been grouped by the functional classification of the roadway and plotted on graphs in Figures 7-3 through 7-5. The functional classification of the roadway is an indication of the type and amount of traffic a roadway is expected to serve.

Figure 7-3 – Average Daily Traffic of Pioneer Valley Interstates

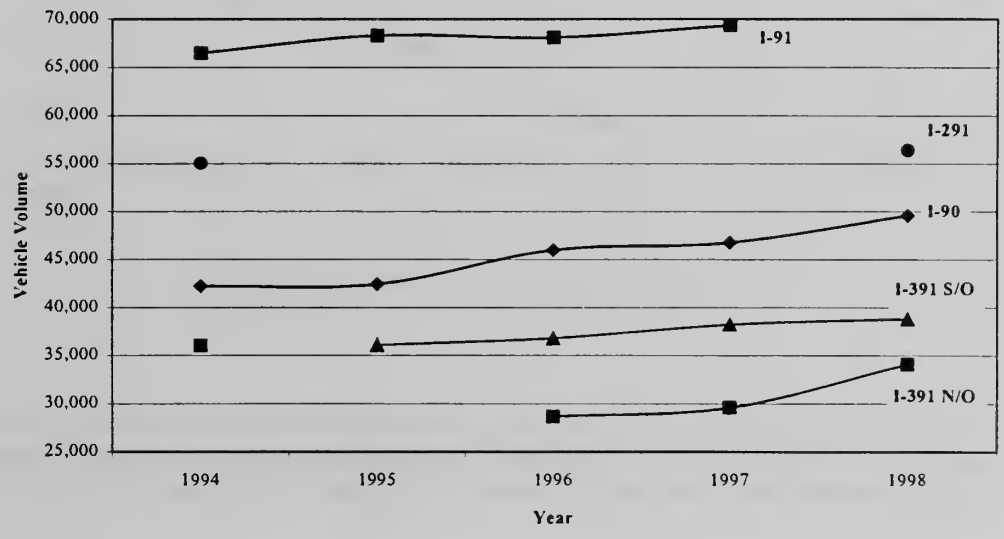


Figure 7-4 – Average Daily Traffic of Pioneer Valley Arterials

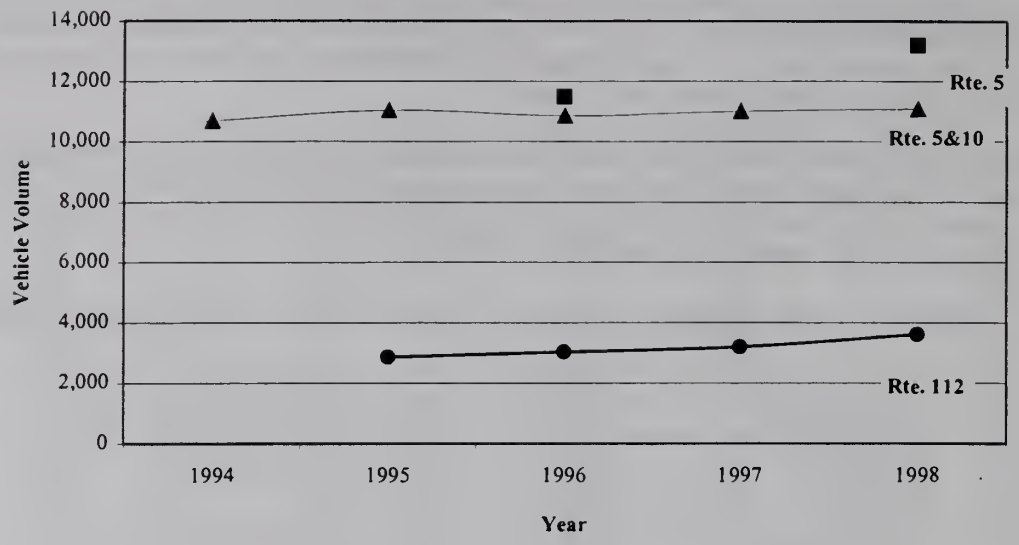
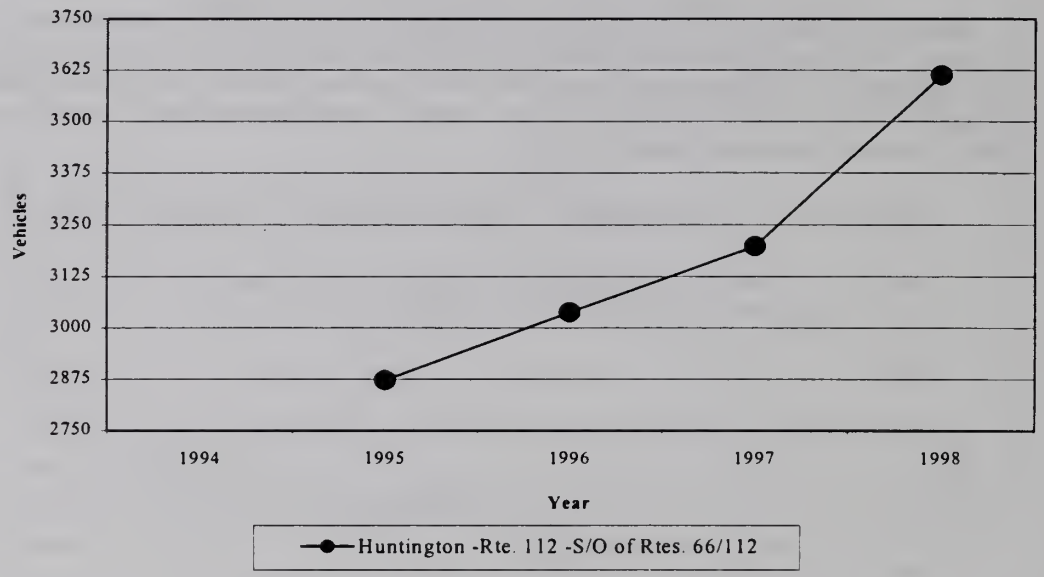
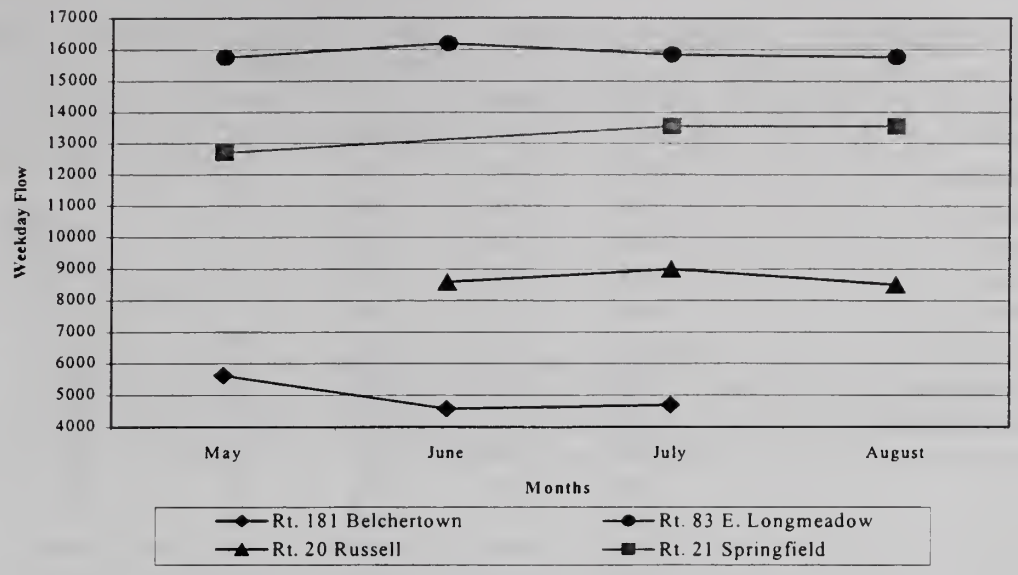


Figure 7-5 - Average Daily Traffic of Pioneer Valley Rural Roadways



The PVPC also maintain four of its own traffic count stations to collect information on seasonal variations in traffic count data. As more data becomes available from this program it is anticipated that regional adjustment factors and growth rates can be developed. This information is presented in Figure 7-6.

Figure 7-6 – Average Weekday Flow at Selected Locations in the Pioneer Valley



8. Vehicle Registration and Ownership

Based on information available from 1996, a total of 422,833 vehicles were registered in the Pioneer Valley region. This translates into approximately 0.70 vehicles per person and is an increase of 9.7 % from 1991. Automobile ownership is down slightly from 1991, however, light truck registrations (which includes SUV's) rose by 44.9%. The City of Springfield has the most registered vehicles with 88,273 recorded in 1996. This translates to 20.9% of registered vehicles in the region. Table 7-9 summarizes the number of registered motor vehicles in the Pioneer Valley by community and type of vehicle.

Table 7-9 - Registered Motor Vehicles in the Pioneer Valley - 1996

Community	Automobiles	Trailers	Light Trucks	Heavy Trucks	Motorcycles	Other	Total
Agawam	16,476	1,060	4,609	488	227	310	23,170
Amherst	12,018	409	2,256	133	137	274	15,227
Belchertown	6,067	666	2,621	170	139	192	9,855
Blandford	614	84	399	17	21	13	1,148
Brimfield	1,581	185	755	80	48	87	2,736
Chester	615	89	452	27	23	17	1,223
Chesterfield	481	57	348	16	9	21	932
Chicopee	29,027	1,723	7,357	880	401	680	40,068
Cummington	458	57	284	12	17	24	852
East Longmeadow	8,405	582	2,232	207	94	203	11,723
Easthampton	8,735	482	2,726	116	169	219	12,447
Goshen	396	43	267	24	15	12	757
Granby	3,186	403	1,467	109	64	99	5,328
Granville	789	108	436	44	22	28	1,427
Hadley	2,610	263	1,012	110	29	82	4,106
Hampden	2,723	343	1,105	83	52	78	4,384
Hatfield	1,962	359	883	275	36	74	3,589
Holland	1,097	102	544	26	39	26	1,834
Holyoke	17,775	537	3,547	204	195	297	22,555
Huntington	954	117	597	24	27	43	1,762
Longmeadow	10,036	282	1,594	43	64	97	12,116
Ludlow	10,658	765	3,321	316	161	206	15,427
Middlefield	221	21	173	9	13	10	447
Monson	3,986	446	1,938	156	124	140	6,790
Montgomery	386	59	237	15	12	10	719
Northampton	15,174	725	3,943	309	203	293	20,647
Palmer	6,578	575	2,479	224	164	195	10,215
Pelham	814	66	259	14	10	27	1,190
Plainfield	270	31	178	7	5	13	504
Russell	776	153	424	19	16	17	1,405
South Hadley	8,918	639	2,623	208	110	191	12,689
Southampton	2,677	377	1,266	89	48	124	4,581
Southwick	4,511	526	2,077	164	115	146	7,539
Springfield	68,264	2,875	13,165	1,474	761	1,734	88,273
Tolland	190	23	114	12	10	7	356
Wales	857	86	442	24	33	32	1,474
Ware	4,675	384	1,901	123	122	101	7,306
West Springfield	15,968	1,037	3,926	525	211	383	22,050
Westfield	19,163	1,563	6,204	534	300	467	28,231
Westhampton	700	86	410	25	16	26	1,263
Wilbraham	7,933	657	2,026	206	111	201	11,134
Williamsburg	1,375	113	679	62	20	48	2,297
Worthington	597	71	356	22	17	44	1,107
Pioneer Valley Region	300,696	19,229	83,632	7,625	4,410	7,291	422,883

Source: Massachusetts Department of Revenue

B. PASSENGER TRANSPORTATION

The Pioneer Valley is home to an extensive transit system that offers many different modes of public transportation. Intracounty and Intercity buses, paratransit, ridesharing and park and ride services are all vital parts in the mobility of the region's residents. What follows is a summary of these intermodal services. Amtrak and the commercial airlines are also public carriers on an intercity basis and are described in later sections.

1. PVTA

a) Fixed Route

The Pioneer Valley Transit Authority (PVTA) operates an extensive bus system within the region. The PVTA was formed on August 20, 1974 with the purpose of rebuilding and expanding the region's transit fleet and services. Today, the PVTA offers cost-effective service to the members of its 24 cities and towns, 22 located in Hampden and Hampshire County and two in Franklin County.

The communities that compose the PVTA district can be divided into two basic areas: the northern tier and the southern tier. The northern tier is predominantly suburban and is composed of the communities of Amherst, Belchertown, Easthampton, Hadley, Leverett, Northampton, Pelham, Sunderland, Ware, and Williamsburg. The southern tier may be divided into an urban core, composed of Springfield, Chicopee, and Holyoke, and a suburban area composed of Agawam, East Longmeadow, Granby, Hampden, Longmeadow, Ludlow, Palmer, South Hadley, West Springfield, Westfield, and Wilbraham.

Since 1976, PVTA has pursued several state and federal grant programs with the purpose of providing passengers with improved levels and quality of service. These programs were designed by the federal government to encourage the implementation and development of mass transit. Aging vehicles have been replaced and virtually all fixed facilities have been replaced, upgraded, or expanded.

The capital and service improvements implemented since PVTA's creation resulted in major ridership increases – peaking at nearly 13 million in 1985. Between 1985 and 1993 ridership declined by 15 percent. Beginning in 1993 ridership has made modest but steady gains. Overall, in the decade of the 90's ridership is up over 2 percent. See Table 7-10.

Table 7-10 - PVTA Fixed Route Ridership

Fiscal Year	UMASS Transit	% Change	Transit Express	% Change	Regional Total	% Change
1990	3,995,946	6.4	7,335,418	0.1	**11,331,364**	2.3
1991	3,883,591	-2.8	7,113,317	-3.0	**10,996,908**	-3.0
1992	3,817,737	-1.7	7,332,991	3.1	**11,150,728**	1.4
1993	3,822,305	0.1	7,098,567	-3.2	**10,920,872**	-2.1
1994	3,870,565	1.3	7,188,191	1.3	**11,058,756**	1.3
1995	3,871,178	0.0	7,189,330	0.0	**11,060,508**	0.0
1996	3,943,442	1.9	7,323,534	1.9	**11,266,976**	1.9
1997	4,047,422	2.6	7,516,640	2.6	**11,564,062**	2.6
1998	4,120,106	1.8	7,651,623	1.8	**11,771,729**	1.8
1999	4,049,420	-1.7	7,520,352	-1.7	**11,569,772**	-1.7
				Overall Change		+2.06

Source: PVTA Annual Reports

Under Massachusetts law, transit authorities may not directly operate transit service. Thus, transit authorities contract with outside operators. PVTA currently has contracts with Transit Express Inc., University of Massachusetts Transit Service, and Hulmes Transportation to provide fixed route service. UMASS Transit Service provides service to the Five College area. Transit Express Inc. provides service to the remainder of the communities in the district with the exception of Palmer and Ware which are served by Hulmes Transportation. PVTA also contracts with various local organizations for door-to-door services for the elderly and disabled.

In 1999 service was instituted in Palmer leaving Hampden and Leverett as the only towns in the transit district not currently serviced by the PVTA's fixed route transit system.

See Figure 7-7 showing PVTA's entire service area.

The PVTA operates a fleet of 167 buses. Service operated by Transit Express utilizes 127 buses. Service operated by UMASS Transit utilizes 40 buses. The entire fleet is less than 10 years old thanks to a capital improvement grant to the PVTA. All of the buses operated in the PVTA system are wheel chair equipped.

The PVTA's 44-route network of fixed routes and 2 community shuttles provides comprehensive service in the regions major urban centers, as well as outlying suburban areas.

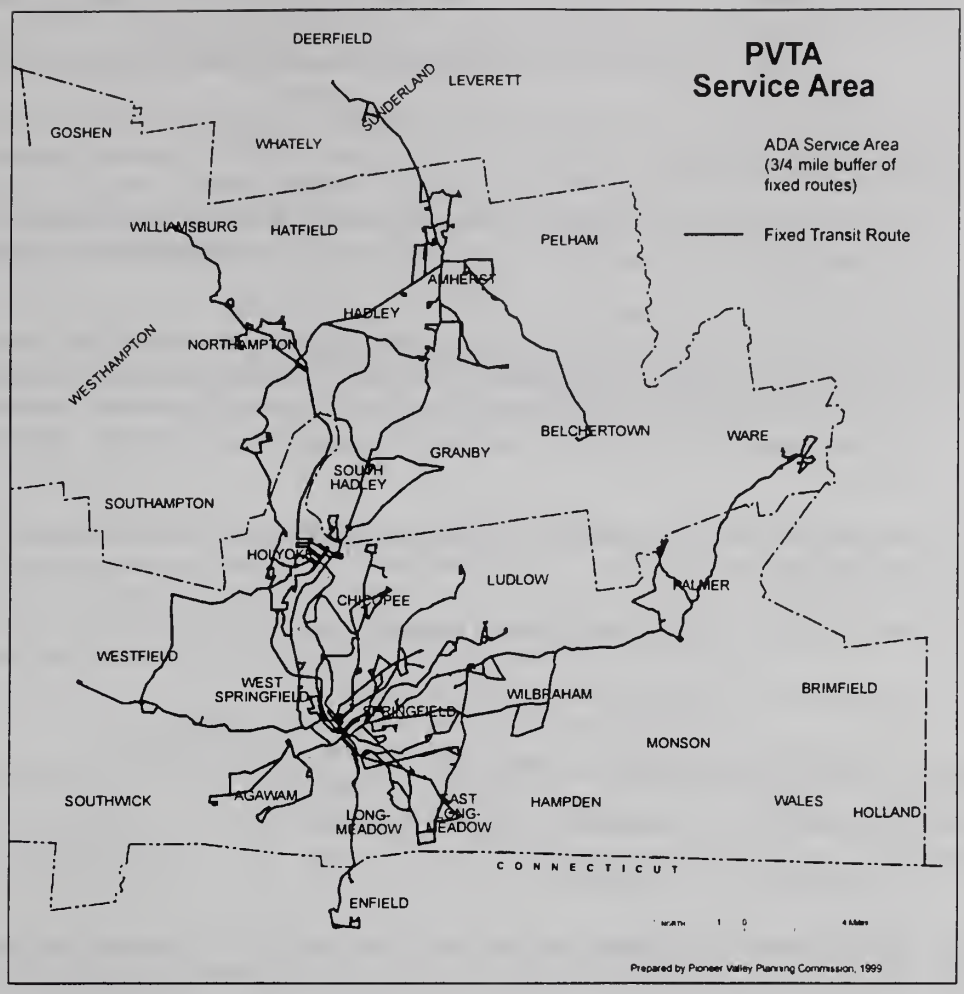
Route headways and hours of operation are revised as needed in response to ridership patterns and service requests.

PVTA's fixed-route fare structure is set up based on zones, with a base fare for the first zone and an extra charge for subsequent zones. The length of these zones varies from route to route. Transfers, when issued, are at no charge to the passengers. The adult base fare was raised in 1990 to 65 cents and it was increased to 75 cents in 1997. The PVTA also has reduced fare programs for the elderly and disabled.

PVTA's monthly commuter passes are available in four different types according to the zones in the fare structure. The elderly and disabled qualify for half fare one-zone passes at a cost of $13.00. The cost of a multi-zone pass for the elderly and or disabled is $18.00. The cost of a standard one-zone pass is $27.00. The cost of a standard multi-zone pass is $36.00.

With a few exceptions, routes operated by UMASS Transit operate fare-free during the school year. The University of Massachusetts, Five Colleges Inc., and the Town of Amherst subsidize the cost of this service. Route B44, serving several low and moderate income housing projects and downtown Northampton, operates with a 25-cent fare.

Figure 7-7 – PVTA Service Area



b) PVTA Paratransit Program (Reserve-a-Ride)

In addition to its regular fixed route service, the PVTA provides door-to-door accessible van service to the 22 member communities located in Hampden and Hampshire County and the two member communities in Franklin County. This service is generally available in a wider area than that which is served by the fixed route transit system available to the general public.

There are two programs operated under the Reserve-a-Ride program: ADA complementary paratransit and Dial-a-Ride service.

ADA complementary paratransit: PVTA provides van service to passengers who are unable to use the bus due to a disability. This form of transportation is comparable to regular bus service in the Pioneer Valley. Passengers must complete PVTA's ADA application to be eligible for ADA van service. Once certified, passengers receive service according to the following requirements:

- Trips can be scheduled the day before the trip is needed

- Service is provided on the same days and during the same hours as regular bus service in the area.

- In order for a trip to be ADA eligible each trip must fall within ¾ of a mile of existing bus service.

c) Dial-A-Ride Service

PVTA also provides van service to individuals over the age of 60 throughout the 24 communities. The service is operated on a space available basis and operates Monday through Friday 8:00 AM to 4:30 PM.

PVTA has four van operators in six tiers operating approximately 100 vehicles. The paratransit service began the process of regionalization in 1995 and recently completed the process. The intent of regionalization was to be more efficient in the delivery of service. Prior to the regionalization, PVTA contracted with over 15 community based operators. The tiers are as follows:

Northern Tier – Amherst, Hadley, Northampton, Easthampton, Leverett, Pelham, Sunderland, Williamsburg

Central Tier – Holyoke, South Hadley, Chicopee, Ludlow

Eastern Tier – Belchertown, Granby, Ware, Palmer

Southern Tier – Longmeadow, East Longmeadow, Wilbraham, Hampden

Western Tier – West Springfield, Agawam, Westfield

Springfield Tier – Springfield

Fares for Reserve-A-Ride program are 50 cents one way in town; $1.00 one way out of town, and $1.50 one way out of county. Table 7-11 shows Reserve-a-Ride ridership from 1987 to 1999.

Table 7-11 - PVTA ANNUAL SPECIAL SERVICES RIDERSHIP

FISCAL YEAR	TOTAL
1987	322,384
1988	282,208
1989	370,230
1990	348,718
1991	305,129
1992	295,614
1993	325,032
1994	270,077
1995	282,013
1996	322,324
1997	308,171
1998	345,575
1999	371,658

Source: PVTA

As of 1993, 10 social service agencies operating 51 lift equipped vans and four station wagons are under contract to the PVTA. In addition, there have been several contracts set up to serve the needs of the human service agencies, such as the State Department of Retardation, Medicaid, Mercy Hospital, the Salvation Army, and the Jewish Nursing Home.

The agencies providing Reserve-a-Ride service schedule trips on a "space available" basis with a minimum advance notice of 24 hours. A few of these agencies are able to provide same day service if a medical situation arises or if space is available. In order to provide more efficient use of the vehicles some agencies have set up a schedule offering services for a particular area at specific times of the day.

Most of the agencies operating the Reserve-a-Ride service suggest a donation from the user. Some of the Agencies charge a fare that is based on in-town and out-of-town service. Subscription service or standardized pick-up routes are run for the elderly to congregate meals. For disabled passengers, a subscription service exists to provide regular transportation to work and school.

d) Park and Ride

There is a total of four Park and Ride lots in the PVPC region. The Massachusetts Turnpike Authority opened parking lots in Ludlow and Palmer. The parking lot at the Five-Town Plaza in the City of Springfield operates in conjunction with PVTA bus routes. The fourth location is an old Massachusetts Highway Department Park and Ride lot at the Fairfield Mall in Chicopee. A summary of the existing Park and Ride lots is presented in Table 7-12.

Table 7-12 - Park and Ride Lot Locations

Community	Location	Spaces Available	Average Occupancy	Lot Conditions	Safety Problem	Services Available	Parking Cost
Chicopee	Route 33 at Fairfield Mall	108	N/A	Paved, Striped	Potentially	PVTA Bus	No
Ludlow – MA Turnpike Exit 7	Rte 21(Center Street) Rear of McDonald's	43	19	Paved, Striped, Fenced,	No	Food, Bike Racks	No
Palmer – MA Turnpike Exit 8	Rte 32 (Thorndike Street) Rear of McDonald's	34	15	Paved, Striped, Fenced	No	Peter Pan Bus, Food, Bike Racks	No
Springfield	Five Town Plaza - Allen and Cooley Streets	89	9	Paved, Striped	No	PVTA Bus	No

2. Private Carriers

The Pioneer Valley Region is served by an extensive intercity transportation network. Scheduled service is provided by four major privately owned companies. These companies provide a mix of local and express routes connecting points within and outside the region with nationwide connecting service. The companies are: Bonanza Bus lines of Providence, Rhode Island; Greyhound Lines of Dallas Texas; Peter Pan Bus Lines of Springfield Massachusetts; and Vermont Transit Lines of Burlington, Vermont. Several other carriers provide a variety of services including large and small bus charters, and packaged tours to a number of destinations within and outside the region.

Most of the intercity public transportation network in the region is concentrated in the City of Springfield. In the city, bus operations are conducted at the Springfield Bus Terminal which was

opened in 1969. The terminal is operated by Springfield Bus Terminal Associates composed of Peter Pan, Greyhound, Vermont Transit, and Bonanza Bus Lines. It functions as the major bus station in Western Massachusetts and as an interchange point for all of the intercity bus lines.

The terminal operates 24 hours a day. There are 16 bays located at the rear of the terminal. Behind the terminal's parking lot is the Peter Pan garage and maintenance facility which houses eight maintenance stalls, a serving lane and indoor parking for 60 buses. The terminal serves as the base of operations for Peter Pan Bus Lines.

According to Peter Pan Officials, an average of 1,600 passengers use the terminal daily. The volume is the combined total of all the carriers using the facility. Approximately 150 scheduled line-haul bus trips operate at the terminal daily.

The Northampton Bus Terminal opened in 1984. The three-story building is a project of the Northampton Terminal Associates, a partnership created by the presidents of Peter Pan Bus Lines and Western Mass Bus Lines. The terminal is operated by Peter Pan and is also served by Vermont Transit. The terminal provides a one-way lane for buses to stop in front of the station. Major Peter Pan stops are located at the University of Massachusetts, Amherst Center, South Hadley, and Palmer.

In Massachusetts, bus companies must receive authorization to operate on specific roadways. Authorization is the responsibility of the Department of Telecommunications and Energy - Transportation Division (formerly Massachusetts Department of Public Utilities) and within the Pioneer Valley Region local routes are approved by the PVTA. In the region, Peter Pan holds the rights to most local (non-interstate) service. As such, the remaining three intercity bus companies are restricted to operating on interstate highways except to stop at the major bus terminals.

a) Bonanza Bus Lines

Bonanza, with headquarters in Providence, Rhode Island, operates routes daily from Providence, Rhode Island to many points in New England and New York including Logan Airport, Boston Massachusetts, New York City, Cape Cod Massachusetts, Hartford Connecticut, Springfield Massachusetts, and the Berkshires.

b) Greyhound Bus Lines

Greyhound Lines, a unit of Laidlaw Inc. is North America's largest bus company and the only nationwide provider of intercity bus transportation. Headquartered in Dallas Texas Greyhound has more than 3,700 destinations in the 48 contiguous United States and Canada. Due to a reciprocal agreement between Greyhound and Peter Pan Bus Lines riders are afforded travel to all points on an hourly basis. Tickets can be purchased from either carrier.

c) Vermont Transit Lines

Vermont Transit, a subsidiary of the Greyhound Lines, operates two routes from Springfield, one to Bellows Falls, Vermont and the other to Newport, Vermont. Stops are made in Northampton and Greenfield, Massachusetts.

d) Peter Pan Bus Lines

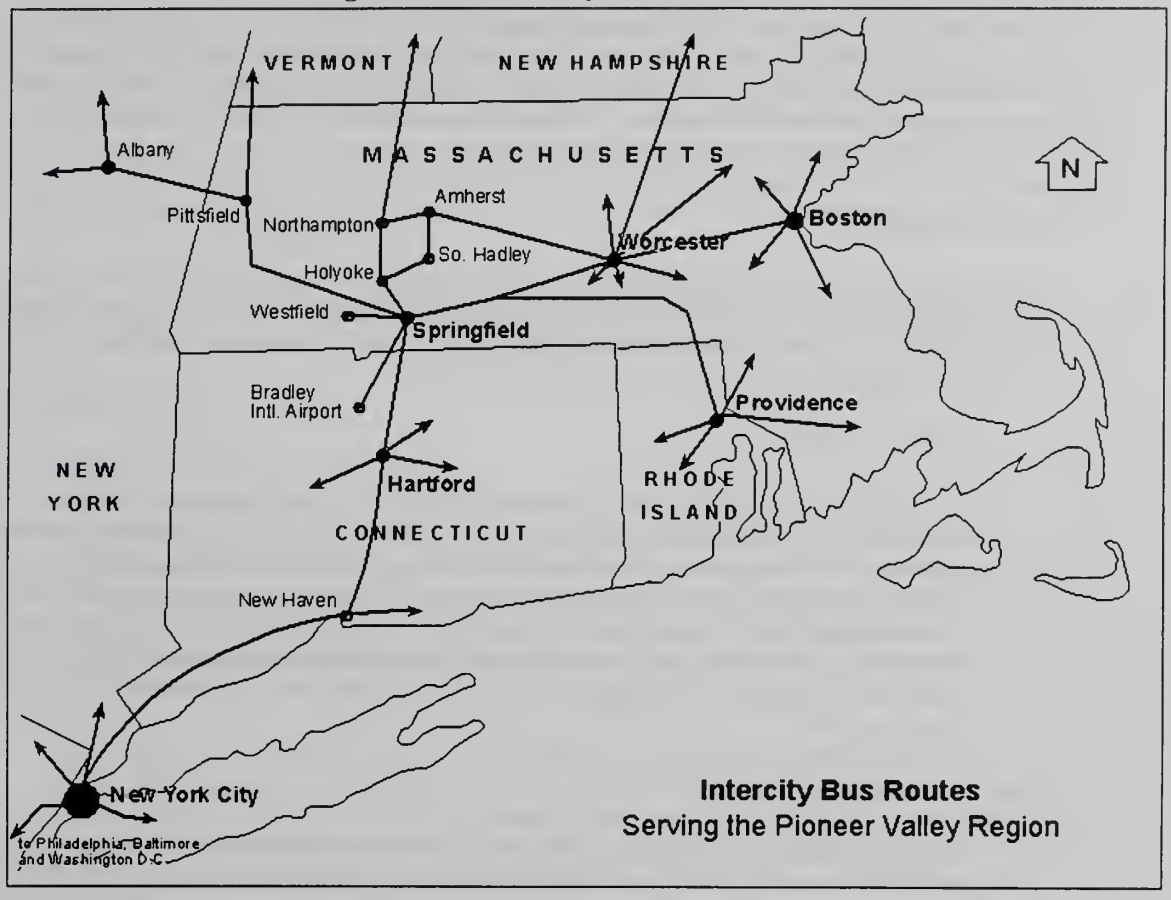
In terms of cities and towns served and passengers carried, Peter Pan is the most significant intercity carrier in the region. Service to points within and outside the region is both extensive and frequent. In Peter Pan's two primary routes, Amherst to Boston via Springfield and Springfield to New York City, buses run hourly. There are about 23 buses running per day per direction in each route. Peter Pan operates major east-west lines between Albany, New York and Boston. Local

east-west service connects Amherst, Northampton, Springfield, Worcester, and Boston. Peter Pan also provides service from the region south to Hartford, and New Haven Connecticut; New York City and to Foxwoods Casino in Ledyard Connecticut. In addition, service from Springfield is provided to Bradley International Airport in Windsor Locks, Connecticut.

Peter Pan has a fleet of 175 buses, of which many are lift equipped and accessible to disabled individuals. The Peter Pan's Call-a-Lift service allows an individual to call in advance to request a particular route to be accessible. In 1998, nearly three million passengers were carried on Peter Pan's scheduled buses in New England and the Northeast.

Figure 7-8 illustrates the intercity bus routes available to the Springfield area. Virtually any destination is accessible from Springfield.

Figure 7-8 - Intercity Bus Routes



3. Charter and Tour Service

The Pioneer Valley Region is well served by motor coach charter and tour providers. In addition, many of the major tourism attractions in the region or on the periphery seek out charters and tours to their sites. These efforts should be encouraged as they provide an efficient means to increase tourism in the region without adding to congestion.

4. Ridesharing

The residents of the Pioneer Valley have the option of using the ridesharing services of Caravan, Inc., a private non-profit organization under contract with the Executive Office of Transportation and Construction (EOTC). Currently, all services provided are directed toward those commuters leaving the region.

The University of Massachusetts hired a full-time rideshare coordinator for the campus last year. A Transportation Management Association (TMA) was also recently established for the Route 9 corridor. The three charter members of the TMA are the University of Massachusetts, Cooley-Dickenson Hospital, and the City of Northampton. Efforts to increase ridesharing for this area are expected to have a positive effect on traffic congestion on Route 9.

5. Passenger Rail

The Springfield station is currently served by 14 trains daily providing extensive service in the northeastern U.S. and connections nationwide. Passenger Rail service is provided on both East-West routes and North-South Routes through the region. The Pioneer Valley has an additional station located in Amherst that is served by two trains per day.

a) North - South Services

Most trains in Springfield are part of Amtrak's Northeast Corridor Business unit and have recently been branded as Acela Regional Service. This service includes six daily departures between 5:30 AM and 3:00 PM, and six arrivals between 10:00 AM and 10:30 PM. Amtrak provides frequent daily service between Springfield and Washington D.C., with major stops at Hartford, New York City and Philadelphia. None of the trains are convenient for commuters to jobs outside the region and are basically limited to long distance travelers. As traffic congestion on I-90 to Boston and I-91 to Hartford increases, it will become necessary to explore the use of commuter rail as an alternative mode.

b) Vermonter

One victim the early 90s Amtrak service cuts was the daily Washington to Montreal train the *Montrealer*, once the primary north/southbound train serving the Pioneer Valley. The State of Vermont, concerned about the possibility of losing its Amtrak service provided Amtrak with state funds to maintain the service and make improvements. The train was renamed the *Vermonter* and Amtrak made changes in both marketing and scheduling that resulted in significant ridership gains. The *Vermonter* is an example of a successful partnership between Amtrak and State and local governments.

c) East - West Service

In addition to the Northeast Corridor service, there is also a long distance train that serves the region. The *Lake Shore Limited* serves Springfield by providing daily service between Chicago

and New York. Unlike all other Northeast Corridor trains out of Springfield, the Lake Shore Limited requires reservations.

The Pioneer Valley's East-West service is limited by a situation common to many Amtrak routes. Amtrak leases the tracks it must use from a local freight railroad. Amtrak owns the trains but does not own the track and physical infrastructure that they travel on. The track and ultimate control over trains is held by the host fright railroad. Here in the Pioneer Valley CSX is the host freight railroad. Since CSX runs its own freight trains over tracks that are also used by Amtrak, opportunities for expanding service on the East-West line may be limited.

C. AVIATION

The Pioneer Valley is well served by air transportation facilities located within or adjacent to the region. Most air travel from the region goes through Bradley International Airport in Windsor Locks, Connecticut situated 15 miles south of the City of Springfield.

Within the Pioneer Valley there are also a number of airports, the largest of which is the Westover Air Force Base facility in Chicopee and Ludlow. Westover, now a reserve base and metropolitan airport, was recently reactivated as a major military facility during operation Desert Shield/Storm. The second largest airport in the region is Westfield-Barnes Airport located and operated by the City of Westfield. It is the third busiest airport in Massachusetts, a general aviation facility home of the Air National Guard 104th Tactical Fighter Group.

The remaining airports are privately owned and operated with much smaller and less sophisticated facilities. These airports serve both business and recreational uses.

1. Public Airports

a) Bradley International Airport

Bradley Airport, located in Windsor Locks, Connecticut, is a state-owned facility that is operated by the Connecticut Department of Transportation, and was designated as a medium hub airport by the Civil Aeronautics Board. The airport opened as an Army Air Corps Base in 1941. After World War II it was taken over by the state of Connecticut and was converted to a commercial facility under the name Bradley Field. The name was changed to Bradley International Airport in the 1960s after a 9,500 foot paved runway was opened to accommodate jet aircraft.

Nine major carriers and nine regional commuters provide commercial air service at Bradley. Since 1982, funds for improvements have been provided through the Bradley Enterprise Fund. Some of the accomplishments under this program are: a new terminal with ten boarding gates, the renovation of the existing terminal, increased short and long term parking, and reconstruction of the main runway. Due to the continued growth of the airport, the Connecticut Department of Transportation has proposed improvements that enhance aircraft operations, and passenger comfort and convenience. Plans are underway to secure a "gateway status" at the airport with direct international scheduled flights. Direct international charter flights are presently available

The airport located 15 miles south of the City of Springfield is the principal commercial airport serving people traveling to and from the Pioneer Valley Region. Survey data taken in 1984 indicates that 30 percent of air travelers using Bradley are from the Springfield/Holyoke/Chicopee area and that about four out of five of the region's commercial air travelers use the Airport.

Bradley Airport is well located to provide easy air access to both the Springfield and Hartford metropolitan areas.

b) Westfield-Barnes Municipal Airport

Westfield-Barnes is a public airport operated by the City of Westfield and it is the home base for The Massachusetts Air National Guard 104th Tactical Fighter Group. The Region's second largest airport is located within the boundaries of the City of Westfield, north of Westfield's central business district and adjacent to the Massachusetts Turnpike (I-90). The airport is also within minutes of I-91.

The airport is classified by the Massachusetts Airport System Plan as a general transport airport providing general aviation service. It serves virtually all aircraft, including commercial jetliners and large, heavy and wide body aircraft. It is capable of handling precision instrument approach operations. The airport consists of two asphalt runways: 02/20 and 15/33. The 15/33 is a general aviation runway, 4,996 feet long and 150 feet wide. It is equipped with medium intensity runway lights. The primary runway 02/20 is 9,000 feet long and 150 feet wide and equipped with high intensity runway lighting. Land-side development is concentrated in three quadrants: The Southwest quadrant, houses general aviation functions as well as fixed-base operators, based aircraft storage facilities, transient aircraft parking, and airport and Federal Aviation Administration administrative facilities.

The Northwest quadrant consists of the land leased to the Massachusetts Air National Guard. Located within this quadrant are the MANG facilities, aircraft parking aprons, hangars, operations buildings and office space. An industrial park is also planned for this area of the airport.

The Northeast quadrant is the home of Gulfstream Aerospace, a subsidiary of General Dynamics, which caters corporate aircraft with its 3 hangars. The MANG has some leased land in this area which is used for storage. A 1988 Master Plan was developed updating the 1982 Airport Master Plan. It has a three-phase development program through a period of 20 years. The priority phase, the terminal area development, consists of the expansion of the commercial, transient, and based aircraft parking aprons; the combination of a new administration/terminal building; automobile parking lots; and hangar facilities for aircraft maintenance and storage purposes.

c) Westover Air Force Base

Classified as a General Utility I airport providing comprehensive aviation services to commercial, business, private corporate, charter and, recently, scheduled commuter flights, Westover is the largest airport facility in the region. Located in the City of Chicopee and the Town of Ludlow within minutes of I-90 and I-91, Westover consists of 4,800 acres of land and two runways. The primary one is the largest runway in Massachusetts at 11,600 feet long and 300 feet wide, and it is equipped with high intensity runway lights.

Construction and activation of Westover AFB began in April 1940. Following World War II, the headquarters of the Military Airlift Command (MAC) were located at the airport. From 1955 until 1974 Westover Air Force Base was a major base of operations for the Strategic Air Command and the largest SAC facility in the eastern United States. The installation was deactivated in April 1, 1974, and since May 19, 1974 Westover has been an Air Force Reserve Base. In October 1987, the base assumed strategic airlift training missions with the redesignated 439th Military Airlift Wing. Tenants at the base include: The Marine Corps Reserve, Army Reserve, Navy Reserve, Army National Guard and the Army Reserve School.

Deactivation of the base resulted in the creation of the Westover Metropolitan Development Corporation (WMDC) as nearly half of its land area was released to civilian uses. WMDC is charged with development of three Westover Industrial Parks, and the commercial aviation component of the Westover Metropolitan Airport. The Westover Metropolitan Airport operates in

joint use with the Westover Air Force Base. The Air Force controls ground and air movements of all aircraft. Take off of military aircraft have priority over civil.

A 1987 Master Plan was developed; it has a two-phase development program. The short range development program (0-5yrs.) includes the construction of taxiway "P", the beginning of a multiphase cargo facility, the construction of a new fixed base operators (FBO) facility area, continuing upgrading of the WMDC aviation fuel facilities and improvements to the passenger terminal area. The long-range development program (5-20 yr.) includes the completion of taxiway "P", long range cargo facilities, the expansion of existing aircraft aprons, rehabilitation of taxiways "S" and "A" and the expansion of the FBO site.

During Operations Desert Shield and Desert Storm, Westover was the main eastbound staging area for the airlift of troops and cargo to the Persian Gulf. Between August 4, 1990 and July 15, 1991 Westover handled more than 1,800 C-5As and other aircraft bound to the Gulf and back, moving approximately 32,000 troops and 80,000 tons of cargo.

2. Private Airports

a) Northampton Airport

The Northampton Airport, formerly known as LaFleur Airport is privately owned and operated. It is classified as a Basic Utility II airport that serves general aviation uses, both business and recreational. Located in the City of Northampton, the airport has one asphalt runway 3,500 feet long and 50 feet wide with low intensity runway lighting. It offers minor and major maintenance service. The airport is closed to aircraft and helicopters with a gross operating weight in excess of 7,500 lbs. Seaplanes can operate on the Connecticut river, which is parallel to the runway.

b) Metropolitan Airport

Classified as a Local Utility airport that serves general aviation uses, the airport is privately owned and operated. An asphalt runway 2,475 feet long and 55 feet wide with low intensity runway lighting and a minor maintenance service area make up this small facility. The airport, located in Palmer at the eastern section of the Pioneer Valley, is only attended during daylight hours.

c) Agawam-Springfield Seaplane Harbor

Located in Agawam this seaport is privately owned and operated. It serves general aviation uses both business and recreational. The seaport has a landing lane 8,000 feet long and 800 feet

D. TRANSPORTATION OF GOODS

The Pioneer Valley Region is strategically located at a geographic crossroads in which more than one third of the total population of the United States can be reached by an overnight delivery. With the emergence of the European Economic Community and the Free Trade Agreement with neighboring Canada, the region is poised to take advantage of new ventures in international trade. The availability of an efficient, multimodal transportation network to move goods through the region is essential for this level of economic activity to be achieved.

A variety of goods are transported throughout the Pioneer Valley Region, including:

- Steel/Metal Products;
- Food Products;
- Paper Products;

- Textiles;
- Chemicals;
- Pharmaceuticals;
- Electrical Goods and Electronic Equipment;
- Fuel Oil;
- Household Products;
- Toys and Sporting Goods;
- Tools;
- Plastics;
- Recyclable Waste;
- Coal;

The region's economy is in transition. Manufacturing was once the mainstay of the region's economy, employing over 29 percent of the work force in 1980. By 1989 however, one-quarter of the region's manufacturing jobs had been lost. At the same time, service employment showed dramatic increases. Today, service industries employ more of the region's work force than manufacturing, a trend shared on state, national, and global levels. While industrialized countries have, over time, experienced a shift in employment from agriculture to manufacturing and on to services, until recently the Pioneer Valleys share of those employed in manufacturing had always exceeded that of the state and nation.

The region is in the midst of an important economic shift which affects both the employment climate (from a manufacturing to a service focus) and the type of commodities transported within the region (from predominantly durable goods to more paper and allied products and electronics). Ironically, though the number of people employed in manufacturing has declined; the volume of goods being produced and transported by active Pioneer Valley manufacturers has actually increased.

Several modes of transportation are available in the region to facilitate the movement of goods. These modes include truck, rail, air and pipeline. The transportation of goods in to and out of the Pioneer Valley region is accomplished by the use of one of these modes, or a combination of several modes.

1. Trucking

This economic shift also affects the transportation of goods in the region. Trucking is currently the primary choice for moving goods throughout the Pioneer Valley. The types of commodities being transported are changing from predominantly durable goods to paper and its allied products and electronics. The mode choice for moving lightweight high-value goods, such as computers and other electronics, is often air rather than truck. In addition, the Free Trade Agreement with Canada and introduction of the international free market improves the ability of the region's businesses to import and export goods. These changes and opportunities affect the volume of goods being moved as well as their route and mode.

Overnight trucking service is available from the region to metropolitan centers throughout the Northeastern United States and Southeastern Canada. Approximately 130 for-hire-trucking companies serve the Pioneer Valley region, providing both full truckload and less that truckload (LTL) service. Many of these companies serve only local areas, but a large number of interstate motor carriers provide service to the towns in the area. In addition, there are numerous private truck fleets that carry freight for their owners. A tandem trailer terminal is located in Chicopee at Massachusetts Turnpike Interchange Number 6.

Many of New England's freight carriers are small, short haul carriers handling feeder and distribution traffic. In the Pioneer Valley, more than half of the trucking companies maintain operations in the Springfield/West Springfield area, and most of the urbanized area communities have at least one trucking firm or independent operator.

Carriers in the Pioneer Valley region serve numerous industries that are outside the region. For example, there are few trucking operations in Franklin County, and consequently some shippers there rely on Springfield-area carriers. Springfield-based trucking firms also provide nation-wide connections to points in Vermont, New Hampshire, Canada, New York State, and other parts of the Northeast. In this sense, the Pioneer Valley exports transportation services to other areas, producing regional income.

2. Rail

Five rail carriers provide freight service in the Pioneer Valley Region: CSX Transportation, Guilford Transportation Industries, New England Central, Pioneer Valley Railroad and MassCentral Railroad

a) CSX Transportation

In June 1999 the assets of Conrail were split between CSX and Norfolk Southern. The break-up of Conrail ended its virtual monopoly on northeastern rail service and allowed new opportunities for price and service competition for the regions rail shippers. CSX took over Conrail's operation in Massachusetts and now owns and operates the east-west mainline between Selkirk, New York and Boston. CSX also owns and operates a spur line between Springfield and Ludlow.

Height clearances above the rail on the Boston and Albany Main line through the region allow for short double stack container service (9'6''+ 8'6") to both West Springfield and Palmer. Clearance improvement would be needed to allow full double stack service (9'6''+ 9'6") in the region.

b) Guilford Transportation Industries

Guilford Transportation Industries is the owner of the Boston & Maine Railroad (B&M) and its subsidiary Springfield Terminal Railway Company (STRC). B&M is the region's second largest rail carrier, operating a north-south mainline along the Connecticut River from Springfield, to East Deerfield. Guilford also owns secondary lines that run from Chicopee to Chicopee Falls and from Holyoke to Westover Industrial Airpark in Chicopee. Lying north of the region, but also important to the region's rail system is the B&M east-west mainline. As a result of the Conrail merger Guilford has developed cooperative agreements with Norfolk Southern and Canadian Pacific Railroad to provide competition with CSX for New England Traffic.

c) New England Central.

The New England Central Railroad (NEC) offers freight service between St. Albans, Vermont near the Canadian border, and New London, Connecticut via the eastern portion of the Pioneer Valley region. Although the line is not heavily traveled, it has been rehabilitated and operates profitably.

d) Pioneer Valley Railroad

The Pioneer Valley Railroad (PVRR) is owned by the Pinsly Company and provides short line service on former Conrail trackage. The PVRR took over two lines in 1982, each approximately 15 miles long, connecting Westfield with Holyoke and Northampton. The PVRR can accommodate intermodal transfers at the ends of each route, has 48-state motor carrier authority, and directly connects to both CSX and the B&M railroads. The Westfield to Holyoke line was recently the recipient of a $1.5 million rehabilitation.

e) MassCentral Railroad

MassCentral (Massachusetts Central Railroad Corporation) is an independent firm headquartered in Palmer, Massachusetts. Like PVRR, MassCentral Railroad provides short line service on a former Conrail line. Since 1979 this railroad has operated the former Ware River secondary line, which runs 24 miles from Palmer, through Ware, to North Barre, Massachusetts. MassCentral connects with Conrail in Palmer. After abandonment by Conrail, the line was purchased and rehabilitated by the Commonwealth of Massachusetts. The Commonwealth maintains ownership, and leases the tracks to MassCentral.

MassCentral currently operates an intermodal facility in the Palmer area, which is an eastern terminus for Conrail. Intermodal freight currently brought to the region (to Palmer) by rail and then trucked north (typically on an overused Massachusetts Route 9 through Belchertown, Amherst, and Hadley to Interstate 91) may continue through the region by rail instead, and reduce congestion on this critical local roadway.

f) Yards Terminals

The region's major freight and intermodal yard is located in West Springfield (CSX). Another major freight and switching yard important to the region but located outside the region, is B&M's North Deerfield Yard in Franklin County. Within the Pioneer Valley other smaller freight yards are located in Holyoke, Northampton, Palmer, Westfield and Wilbraham.

g) Services

Much of the freight moved in Massachusetts is interstate traffic with either Selkirk, New York (CSX) or Mechanicville, New York (B&M) providing connections to long haul lines. In addition to traditional general freight (boxcar) service, all of the region's railroads offer contract rates for volume shipments, consultation services for custom-designed transportation packages, and intermodal freight facilities allowing the transfer of goods from rail to truck and vice versa. The geographic location of the Pioneer Valley at the crossroads of interstate highways (I-90 and I-91) and long-haul rail lines (Conrail and B&M) creates a strategic and attractive location for businesses and industry participating in the local or international marketplace.

3. Air Freight

Air cargo can be broken down into three specific groups: Air freight which includes all types of goods (generally over 70 pounds) transported by air and Express, which includes packages and documents (generally under 70 pounds) transported by air. Air express frequently offers comprehensive pick-up and delivery services, such as those provided by Federal Express; and U.S. and foreign mail travelling by air. The focus of this section will be on air freight and package express.

Air freight and package express services are readily available in the Pioneer Valley Region, and the transportation of air cargo is generally conducted in one of two ways. The first option would be to transport air freight by companies which own and maintain their own all-cargo aircraft fleet, such as Airborne Express, Burlington Air Express and Emissary Airways Inc. The second option, and the primary method for moving most of today's air freight, is via scheduled passenger aircraft for which the shipper places the cargo with a freight forwarding (pooling) company. And the forwarder contracts for blocks of space on commercial airlines for specific routes.

Air freight in the Pioneer Valley Region is predominantly moved through either Bradley International Airport in Windsor Locks, Connecticut, Logan Airport in Boston, or New York City's metropolitan airports. None of the airports located within the region's boundaries offer air cargo services at this time.

a) Bradley International Airport

Bradley International Airport is a medium-hub airport located 15 miles southwest of Springfield, MA, in Windsor Locks, CT. It is the major commercial airport serving the Pioneer Valley for both passenger travel and air cargo shipments. Bradley's convenient location near Interstate 91, and its improved and expanded air cargo facilities, make it the primary choice for the regions shippers. However, airport choice for air cargo transport is dependent on a number of factors, including destination coverage/schedule factors, tariff structure, logistical and contractual considerations, and access time and distance of individual airports. Therefore, some of the region's shippers may choose Boston's Logan airport, or one of New York City's metropolitan airports for air cargo services.

Scheduled all-cargo flights are available at Bradley through a number of different carriers and there is a current listing available from the Connecticut Department of Transportation Bureau of Aviation and Ports. A current listing of passenger flights that make space available for freight forwarders can also be obtained from the Bureau.

b) Westover Metropolitan Airport

The Westover Metropolitan Airport provides access to a large joint military/civilian air facility which served exclusively as a military Strategic Air Command (SAC) base until 1974. At that time the base was deactivated and reclassified as an Air Force Reserve base. Today, in addition to the Air Force Reserve facilities, three industrial airparks are located at Westover.

4. Pipeline

There are presently three pipelines serving the Pioneer Valley. One provides natural gas, while the other two provide petroleum products.

a) Natural Gas

A natural gas pipeline, owned by Tennessee Gas Company (Tenneco), runs along the region's southern edge. The system's trunkline originates at the Gulf of Mexico in Southern Louisiana, travels northeast through the country and region, divides in Hopkinton, Massachusetts, and terminates in Gloucester, Massachusetts, and Concord, New Hampshire. The main line cuts through ten area communities from Tolland in the west to Holland in the east. In the region the line is 24-inches in diameter, and recently completed construction expanded the line's capacity with a parallel loop 30-inches in diameter.

A branch line also runs north from Southwick to Northampton. Construction, completed in 1990, replaced the existing pipeline with a larger, 12-inch diameter line which currently serves the area.

Construction of these improvements has increased the pipeline's capacity in the region. However, the Federal Energy Regulatory Commission (FERC) approves expansion plans based on a demonstrated increase in demand, with approval limited to only the work necessary to satisfy the increased demand. Therefore, despite the new improvements, the system is operating at capacity.

There are several natural gas distribution companies in the Pioneer Valley providing service to the region's communities via their own network of pipelines. Identification of these individual pipeline networks is outside the scope of this report. All, however, are fed by the main Tenneco trunkline.

b) Jet Fuel

Jet Lines, Inc., (Jet Lines) is a common carrier of petroleum products within the states of Connecticut and Massachusetts. Jet Lines is controlled by Con Mass Pipeline Company, a subsidiary of Buckeye Pipeline Company, which in turn is a wholly owned subsidiary of Penn Central Corp. Jet Lines' general office is located in Bloomfield, Connecticut, but management control is directed from Emmaus, Pennsylvania.

The Jet Lines' system includes a trunkline of approximately 111 miles in length. Of this, 93 miles are 12-inches in diameter, 7 miles are 10-inches in diameter, and 11 miles are 8-inches in diameter. There are also a number of spur lines to individual shippers that vary in length and diameter. Petroleum products enter the system at Jet Lines' New Haven Harbor receiving terminals. These products originate from refineries at various locations including the East and Gulf Coast of the United States, and the Virgin Islands. Some petroleum products are barged up the Connecticut River to East Hartford where they are transloaded into the pipeline for shipment further north. The trunkline terminates in Ludlow, Massachusetts.

The products can be taken off at any of the twenty delivery terminals in nine cities located along the line, plus two branch lines. The nine cities are (in order travelling northward along the trunkline) Portland, Cromwell, Rocky Hill, East Hartford, Hartford, Melrose, Scitico, (all in Connecticut) Springfield and Ludlow (both in Massachusetts). The branch lines extend to Bradley International Airport in Windsor Locks, CT, and Westover Air Force Base in Chicopee, MA.

c) Gasoline, Kerosene, Distillates

Mobil Pipeline Company, Inc. operates a petroleum product pipeline between Providence, Rhode Island and Western Massachusetts. The branch office that operates this pipeline is located in Plainfield, New Jersey. The branch office has limited authority and the pipeline is primarily managed at the Mobil Pipeline Company's main headquarters, located in Dallas, Texas.

Most of the pipeline located in the Pioneer Valley is 6-inches in diameter with a few sections being 8-inches in diameter. Petroleum products are generally delivered to the pipeline by water at Providence, Rhode Island. The products then travel in a northwest direction to Massachusetts. At Worcester, Massachusetts, the pipeline divides and products can be transported northward to Leominster, Massachusetts, or westward to Holyoke, Massachusetts. Mobil Chemical Company owns and operates a petrochemical plant in Holyoke.

The pipeline divides again approximately five miles east of Holyoke. This branch line goes southward through Springfield, into Connecticut, and terminates at Hartford, Connecticut. As of January 1, 1984, Hartford was eliminated as a destination, and pipeline flows now terminate at Springfield, MA

5. Other Modes

No barge transportation is provided on the Massachusetts portion of the Connecticut River, and few of the region's shippers make use of the barge services available south of Hartford. A 1985 study conducted by a private firm for the United States Army Corps of Engineers examined the economic feasibility of extending navigation on the Connecticut River north of Hartford to Holyoke, Massachusetts, a distance of 32.5 miles. It was concluded that the extension would be economically infeasible due to the prohibitive cost of the river dredging and raising of bridges that would be necessary to accommodate the barges.

E. NON-MOTORIZED TRANSPORTATION

In 1996, the Massachusetts legislature took a significant step toward accommodating bicyclists and pedestrians in the Commonwealth, enacting Chapter 87 [MA ST 90E s 2A] of the Massachusetts General Laws. This legislation and the MassHighway Engineering Directives that followed influence the design and construction of public roadway project in the state. Engineering Directive E-98-003 defines recommended travel lane widths, and establishes a benchmark for reasonable bicycle and pedestrian accommodations. The benchmark for pedestrian accommodations is to, "provide one continuous paved surface or sidewalk along all roadways where pedestrian access is legally permitted." The design guidelines of the Directive apply to all full depth reconstruction projects funded through Chapter 90.

Since the passage of Chapter 87, many communities have expanded their sidewalk networks by incorporating sidewalk improvements in larger roadway construction projects and included additional shoulder width for bicyclists. While these efforts have provided new opportunities for thousands of people to walk and bike to destinations, many infrastructure needs still exist.

The popularity of bicycling in the Pioneer Valley has led to the creation of a several guidebooks specific to the region including a the Rubel Bike Map to Western Massachusetts, Bicycle Touring in the Pioneer Valley (Nancy Jane), Bicycling the Pioneer Valley (Marion Gorhan), Touring Jacob's Ladder by Bicycle or Car (PVPC) and Jacob's Ladder Trail Western Region Off-road Bicycle and Trail Guide (PVPC). These publications and the popularity of regional cycling clubs such as the Franklin-Hampshire Freewheelers, the Springfield Cyclonauts, MassBike, and Northeast Sport Cyclists are testimony to the unique quality and growing popularity of bicycling in the Pioneer Valley.

1. On- Road Infrastructure

MassHighway Directive E-98-003 established a benchmark for reasonable on-road accommodation as a "continuos usable paved shoulder adjacent to the outside travel lane in each direction on roadways where bicycles are legally permitted. The desirable width of the outside travel lane plus the paved usable shoulder (curb lane) is at least 5 meters (plus 0.5 meter "guardrail" offset). When this width cannot be reasonable accommodated, the minimum width of the outside travel lane plus the paved usable shoulder (curb lane) for the accommodation of bicycles is 4.5 meters (plus 0.5 meter "guardrail" offset)." For roadways with low speeds of less than 45 mph combined with low volume of less than 2000 AADT, the minimum roadway widths is defined in the Highway Design Manual under the Low Speed / Low Volume standard. Using this, standard travel lanes may be as narrow as 2.75 meters with no shoulder.

Regardless of the standard used, bicyclists should be expected on the roadway, and should be accommodated. In 1997 PVPC began assisting cities and towns by collecting data on roadways and rating conditions using a Bicycle Level of Service (BLOS) evaluation system. Amherst, East Longmeadow, and Northampton have completed the Bicycle Level of Service evaluation with more communities expected to participate in the future.

A major concern for pedestrians and bicyclists are the 673 bridges in the region. While most new or reconstructed bridge projects have followed state and federal guidelines for improving pedestrian and bicycle access, many bridges still lack sidewalks, and adequate shoulder width. The design and maintenance of these bridges directly influences the ability of people to walk or bicycle.

2. Bicycle Access to Transit

In 1997 the Pioneer Valley Transit Authority created the "Rack and Roll" program to improve access for bicyclists to transit. PVTA installed bicycle racks to the front of all buses in the in the five college area of Hampshire County. The program was funded by MassHighway's Transportation Demand

Management Program and is designed to increase levels of bicycling. In addition to the bus racks, PVTA provided on-street bicycle parking racks for 400 bicycles.

3. Off Road Infrastructure (Bikepaths and Multi-use Trails)

Off-road facilities include multi-use trails and traditional bikepaths or rail trails. Four communities currently provide multi-use paths or "rail trails' totaling 17 miles in the region, while 14 others have similar projects under design with MassHighway. The two bikepaths in the region include the Norwottuck Rail Trail and the Northampton Bikepath.

The Norwottuck Rail Trail is the region's largest bikeway project and opened in 1993. The Norwottuck is 10 miles long connecting the communities of Northampton, Hadley, Amherst, and Belchertown. The route facilitates travel between the different communities, educational facilities, downtown commercial areas, and major employment centers. Weekend counts on the bikepath range from 600 to 1200 per day during the season. The portion of the highway between Northampton and Amherst, which carries a particularly high volume of traffic, is frequently congested and is one of three State designated "corridors of critical concern" in Massachusetts.

The popularity of multiple use trails in the Pioneer Valley has brought new challenges and opportunities to those that use and manage these facilities. The domination of bicycles on trails like the Northampton Bikepath users in the 1970s have changed to include a mix of people using in-line skates, three and four wheeled cycles, trailers, runners, walkers, skateboards and baby carriages. Yet the Norwottuck Rail Trail is not only a recreation facility. A trail survey in 1997 showed 25 percent of weekday trail use was for commuting to work, school or shopping. Trips that would otherwise be made with a motor vehicle.

Off-road facilities including bike paths and multi-use trails introduce new users to the benefits of walking and bicycling while isolating users from potential conflicts with motorized traffic. These facilities provide economic benefits from increased tourism; and increase the percentage of bicycling and walking trips. (In the Northampton and Amherst area, census zones where three off-road facilities exist averaged 23.7 percent of commuter trips by bike or on foot, compared to only 3.8 percent for the region as a whole.)

4. Pedestrian Circulation

Pedestrian access and circulation are typically better in town or city centers due to the physical design of such places. Shops, offices, restaurants and other amenities are generally clustered together and connected by a pedestrian network which is often more accessible and efficient than the vehicle network. The central business districts of Amherst, Northampton and Springfield offer good examples of downtowns sensitive to pedestrian circulation and access. Sidewalks and walkways are extensive; crosswalks are signalized and access points for persons with disabilities are incorporated.

Sidewalks are the most common infrastructure feature devoted to pedestrian circulation. Whether or not sidewalks are provided in a community can influence the area's overall character and function. In addition to the sidewalks themselves, crosswalks and points of access for persons with disabilities can influence the degree to which these pedestrian networks facilitate circulation. The provision of sidewalks in the region varies with respect to location, quality and function. Many communities in the Pioneer Valley have realized the benefit of encouraging walking through infrastructure improvements. The town of Ludlow constructed sidewalks within a mile of every elementary school. With children walking to school the town revamped its crossing guard program and saved money on busing. With local funding sources in short supply, many communities have had to "get smart" when it comes to pedestrian improvements. To lower costs, East Longmeadow developed a prioritized sidewalk infrastructure improvement plan and began incorporating the cost of sidewalk improvements into larger roadway re-construction projects. In the Forest Park neighborhood of Springfield, public works

officials replaced painted crosswalks with new long wearing thermoplastic designs. While more expensive initially, the new crosswalks will last 5 times as long as the ones they replaced.

Sprawl continues as the characteristic of development in the Pioneer Valley. The communities with the ten highest residential growth rates in the decade between 1980 and 1999 were all rural or suburban. This trend presents new challenges and opportunities for infrastructure improvements pedestrians. Rural communities that previously lacked densities to justify sidewalks are now seeing residential subdivisions and commercial strip development that warrant sidewalks. Planning boards in these towns are reviewing subdivision rules and regulations that might require developers to pay for new sidewalks as demand outpaces municipal budgets.

CHAPTER 8

NEEDS AND ISSUES

A. HIGHWAY

1. Safety

Safety is a principle concern in most transportation plans and designs. Highway Safety focuses on the reduction of traffic accidents and resulting deaths, injuries and property damage occurring on public roads. Included is passenger vehicle movement, truck conflicts, pedestrian and bicycle travel and bridge conditions.

The number of occurring incidents continues to increase as the vehicle miles traveled increases. Simply, the additional travel on our region's roadways provides more opportunity for conflict. The high accident locations identified annually by the Massachusetts Highway Department (MHD) typically include the intersections and interchanges that operate at or near the designed capacity. Other locations may also include those that have design or operational deficiencies unrelated to capacity such as sight distance, lighting or grade problems.

A high priority is placed on the preservation and restoration of highway safety during the selection of project implementation. The unfortunate situation which exists is that this activity typically occurs after the problem has been identified and incidents have occurred.

2. Congestion

Congestion typically occurs when the demands on a system surpass the actual handling capacity. These types of conditions are prevalent in areas where a number of roadways converge onto a single segment, like major bridge crossings. Limited by lane capacity and expensive to construct, bridges have a tendency to bottleneck traffic with few alternative routes of travel. Feasible alternatives to congestion relief through increases in roadway capacity without actual lane expansion are strongly encouraged. This approach requires that vehicle users, commuters and travelers alike, change their travel patterns and opt for more congestion friendly alternatives such as public transportation, ridesharing, bicycling and walking.

Congestion problems are inventoried and analyzed using the Congestion Management System (CMS) and the input of communities. Pioneer Valley traffic congestion is localized but is very problematic in areas such as Route 9 in Hadley, Route 10/202 in Westfield, I-91 and Sumner Avenue in Springfield, and Route 66, Route 10 and Main Street in Northampton. The CMS prioritizes the deficient corridors and Table 8-1 outlines some of the current corridors with congestion in the region.

Table 8-1 - Pioneer Valley Region Congestion Management System - Problem Locations Identified

COMMUNITY	LOCATION	LIMITS
Agawam	Route 147 and Route 159	Rowley Street to Federal Street
Agawam	Route 75	Mill Street to Route 159 and Route 147
Agawam	Route 57	Poplar Street to Route 187
Agawam/Springfield	Route 5 (South End Bridge)	South End Bridge Including Access Ramps
Belchertown	Federal Street/N. Main Street/S. Main Street	N. Main St/Jackson St to S. Main St/Maple St
Chicopee	Prospect Street	Route 116 to Buckley Boulevard
Chicopee	Memorial Dr/Broadway St	East Street to Main Street
Easthampton	Route 10 and Route 141	Route 10/Lyman Av. to Route 141/Chapel Street
East Longmeadow	Route 83	Harkness Avenue to Dearborn Street
East Longmeadow	Downtown Rotary	Seven Leg Rotary
Hadley/Northampton	Rte. 9 (Calvin Coolidge Bridge)	Bay Road to Damon Road
Hadley	Bay Rd	Lawrence Plain Rd to Route 9
Holyoke	L. Westfield Road and Homestead Ave.	Whiting Farms Road to Upland Road
Longmeadow	Route 5	Forest Glen Road to William Street
Ludlow	Center Street	Cherry Street to Mass Turnpike Entrance
Ludlow/Springfield	Route 21	East Street to North Branch Parkway
Northampton	Damon Road and Bridge Road	Industrial Drive to King Street
Northampton	Route 10	Old South Street to Main Street
Northampton	Route 9	Hawley Street/Market Street to Prospect Street
Springfield	Magazine Street and Armory Street	Worthington Street to Armory Street/I-291 Rotary
Springfield	Main Street and Locust Street	Carew Street to Fremont Street
Springfield	Route 20A (Page Boulevard)	East Street to Oakdale Street
Springfield	Route 20	Rte. 20/Plainfield Street/Avacado Street
Springfield	Sumner Avenue	Forest Park Avenue to White Street
Springfield	Roosevelt Avenue	Wilbraham Road to Crest Street
West Springfield	Route 5	Ashley Avenue to Morgan Road
West Springfield	Route 20	Kings Highway to the Route 5 Rotary
Westfield	Mechanic Street and Meadow Street	Route 20 to Route 10/202
Westfield	Route 10/202	Main Street to Sunset Drive
Westfield	Washington Street and Franklin Street	Court Street to Elm Street
Westfield	Route 20	E. Mountain Road to Westfield Shops Entrance
Wilbraham	Stony Hill Road	Springfield Street to River Road

Source: PVPC

a) Route 9 Corridor

The Route 9 Corridor Study Area is aligned in a generally southwest to northeast direction for a distance of approximately five miles, from Damon Road in Northampton, across the Connecticut River, and through the Town of Hadley to University Drive in Amherst. Route 9 is the principal east/west arterial highway in the northern part of the Pioneer Valley region.

The Route 9 Corridor study began as a result of the increasing incapacity of Route 9 to handle the volumes of traffic that regularly utilize it between Northampton and Amherst. The study identifies both short term and long term improvements to the existing highway. Some recommendations made within the plan include:

- Installing continuos right-turn lanes where there is a high frequency of driveways joining Route 9;
- Improving transit passenger amenities such as providing bus shelters and increasing bus shelter size;
- Developing commuter alternatives such as discouraging single-occupant automobile; usage, encouraging employer-sponsored carpooling and vanpooling and instituting an alternative work hours program;
- Modifying the Calvin Coolidge Bridge by widening it to four lanes, adding a sidewalk, and building a shoulder/bike lane;
- Widening Route 9 to four lanes between Calvin Coolidge Bridge and West Street in Hadley;
- Developing either a two lane or four-lane diversion between the Calvin Coolidge Bridge and West Street; and,
- Investing the feasibility of constructing rail transit to parallel Route 9.

b) Route 5 Corridor

From September 1990 to December 1991, the Pioneer Valley Planning Commission studied traffic and land use conditions along a segment of Route 5 that begins at the rotary intersection with Route 20 in West Springfield northerly through the West Springfield/Holyoke municipal boundary to the Beech Street intersection in Holyoke. Before the construction of interstate 91, Route 5 served as one of the main north-south routes through the Pioneer Valley. The corridor study area focused on land uses directly adjacent to the Route 5 corridor, and zoning districts whose primary access to the region was through Route 5.

Trends in land development and traffic growth were identified, and their impacts on the capacity of the roadway in the corridor were analyzed. In addition, projections of future development were made, and estimates of future traffic patterns were then derived, which were evaluated to determine if the corridor could accommodate future traffic. Some of the recommendations developed for this study include:

- Establish a Route 5 Corridor Planned Zone;
- Protect environmentally-significant land parcels in the Route 5 Corridor;
- Require traffic impact statements for larger developments and high-traffic volume generating uses;
- Control infill development in existing large commercial shopping centers;
- Adopt trip reduction plan requirements;
- Establish access standards;
- Upgrade local sign regulations;
- Improve municipal parking and landscaping regulations;
- Strengthen buffer requirements for buffers between commercial or industrial districts and residential districts;
- Upgrade parking lot landscaping requirements;

- Develop or improve pedestrian sidewalks and bicycle paths;
- Continue the operation of the Route 5 Corridor Advisory Committee;
- Provide for pedestrian safety in the Route 5 Corridor, and;
- Establish standardized development fees.

c) Route 20 Corridor

The Route 20 corridor was identified as a congested area by the Pioneer Valley Planning Commission's (PVPC) congestion management system. Completed in the fall of 1998, the Route 20 Corridor Study is the interdisciplinary approach agreed upon by the City of Westfield, the Town of West Springfield, and PVPC to identify and analyze alternatives geared towards reducing the current and anticipated future congestion in this area.

The Route 20 study area begins at the intersection of the North End Bridge (Route 20) with the Route 5/Route 20 rotary in West Springfield and continues west to the intersection of Main Street (Route 20) with Elm Street (Route 10/202) in Westfield. In addition, a small portion of Elm Street from Main Street to Meadow Street has been included in the study to account for the proposed new bridge over the Westfield River. The total study area covers a distance of approximately 8.5 miles.

A series of short and long term recommendations were developed to address the transportation, land use, and transit issues identified as part of the study. These recommendations are summarized in Table 8-2.

Table 8-2 - Route 20 Corridor Study Recommendations

Recommendation	Location	Implementing Agency
Repainting of pavement markings	Rte 20 Corridor	Based on jurisdiction.
Elm Street improvements	West Springfield	Town of West Springfield
Park Street/Elm Street intersection improvements	West Springfield	Town of West Springfield
"No Parking" signs and construction of parking bay	West Springfield	Town of West Springfield
Install "STOP" sign	Westgate Plaza	Westgate Plaza
Install curve warning signs near Sibley Avenue	West Springfield	MassHighway
Removal of "No U-turn" restriction at Route 20/Route	Westfield	MassHighway
Improvement and maintenance of roadway signs.	Rte 20 Corridor	Based on jurisdiction.
Relocation of pedestrian crossing signal	West Springfield	MassHighway
Raised median to prohibit movements from Elmdale	West Springfield	Town of West Springfield
Improvements to Route 20 viaduct and bridge between	Westfield	MassHighway
Traffic signal maintenance program	Rte. 20 Corridor	Based on jurisdiction.
Traffic volume monitoring program	Rte. 20 Corridor	PVPC
Shoulder and sidewalk construction (where feasible)	Rte. 20 Corridor	Based on jurisdiction.
Street light installation	Rte. 20 Corridor	Respective Community
Two-way left turn lane along Route 20 from North	West Springfield	Town of West Springfield
Closed loop traffic signal system on Route 20 from	Westfield	MassHighway
Traffic impact study for reuse of H.B. Smith site.	Westfield	City of Westfield
Feasibility study on replacement of the Route 5/20	West Springfield	MassHighway
Land use recommendations	Rte. 20 Corridor	Respective Community
Increased marketing of Route Red 10	Rte. 20 Corridor	PVTA
Internal transit service for Westfield Shops and	Westfield	Westfield Shops, Westgate
Red 10/Green 02 transfers	Springfield	PVTA
Transit safety recommendations	Rte. 20 Corridor	PVTA
Bus stop recommendations	Rte. 20 Corridor	PVTA
Transit service for Meadow St., Mechanic St.,	Westfield	PVTA
Transportation Center at Park Square	Westfield	City of Westfield
Limited Stop/Express Bus Service along Route 20	Rte. 20 Corridor	City of Westfield

d) East Longmeadow Rotary

The Pioneer Valley Planning Commission (PVPC) as part of our regional congestion management system identified the rotary as one of the top congested areas in the region. East Longmeadow is home to a growing industrial area and two of the regions largest employer's: American Saw and the Milton Bradley Corp. It is anticipated that future traffic conditions will continue to deteriorate at this location as access to this area in the southern portion of East Longmeadow is provided mainly through the existing rotary.

The rotary is currently under study as part of a joint effort by the PVPC and a private consulting team. The goal of the study is to identify and analyze potential improvement alternatives, including alternate routes of travel, to the existing rotary in the center of East Longmeadow. The focal point of this study is the intersection of Route 83 (North Main Street) with Route 83 (Somers Road), Route 220 (Shaker Road), Route 186 (Prospect Street), Maple Street, Elm Street and Pleasant Street in the center of town - commonly referred to as the East Longmeadow Rotary. A detailed analysis of existing traffic operations, safety issues, and pedestrian and bicycle concerns is proposed. This study is designed to identify existing travel patterns through the town and to develop a wide range of conceptual solutions that could be implemented by the Town of East Longmeadow or the Massachusetts Highway Department (MassHighway). It is anticipated that the study will be completed by late fall of 2000.

e) Other Regional and Local Highway Studies

(i) Boston Road Corridor Study

The Boston Road Corridor Study Area extends from the intersection of Breckwood Boulevard and Boston Road in Springfield easterly to the convergence of Route 20 (Boston Road) at the Boston Road and Pasco Road intersection through the Springfield-Wilbraham municipal boundary to the Wilbraham/Palmer town line. The Boston Road Corridor study began in June of 1994 in response to existing transportation and safety problems resulting from intense development along the corridor.

The corridor serves as a major retail resource for the region and provides many services to local residents in both municipalities. The proximity of the corridor to the major interstate transportation routes, Route 291 and Route 90 has recently encouraged development. This study examined the existing land use and traffic conditions and what impacts future development would have along the corridor. Recommendations suggested within this study pertain to the communities of Wilbraham and Springfield individually, as well as collectively and the:

- Creation of a planned mixed use development zone;
- Development of a network of bicycle/pedestrian circulation paths;
- Upgrade of local sign regulations;
- Refinement of municipal parking and landscaping regulations;
- Enhancement of performance standards for commercial and industrial uses;
- Encouragement of transit use;
- Identification of sites for urban infill redevelopment;

- Adoption of a site plan approval procedure;
- Expansion of sewer capacity; and,
- Creation of a river protection district.

(ii) State Street Signal Coordination Project

The goal of the State Street Signal Coordination Project was to develop a signal coordination plan to reduce congestion and improve mobility along a 1.5 mile segment of State Street in downtown Springfield. This segment of State Street includes eight signalized intersections and four unsignalized intersections. A total of four different signal coordination scenarios were developed as part of the study. The preferred scenario recommended coordinating five intersections along State Street from Dwight Street to Saint James Avenue. New traffic signal control equipment was purchased for two of the eight signalized intersections as part of this project.

(iii) Downtown Easthampton Traffic and Parking Study

This study updated a study performed in 1984 by the PVPC. The City had concerns regarding traffic congestion and queues at major intersections in downtown Easthampton as well as existing parking conditions and method of improvement. A summary of existing and future traffic and parking conditions, parking management alternatives, and recommendations to improve traffic and parking conditions were developed as part of the study. Preferred recommendations included the elimination of parking along one side of Cottage Street to improve travel lanes widths and reduce existing bottlenecks in this area.

3. Preservation

One of the greatest investments made by local communities, states and nations alike, is the transportation system. Each and everyday, highway investments are deteriorating at a rate greater than with which routine maintenance activities can keep pace. The result is an aging, distressed roadway and bridge system. In order to preserve this investment, strategic improvement applications need to be planned and applied in a timely fashion.

a) Bridges

A total of 109 bridges in the Pioneer Valley Region have a posted weight restriction and 12 are closed to motor vehicle traffic. This poses a serious impact to the movement of people and goods throughout the region. A complete listing of bridges with a weight restrictions in the Pioneer Valley is shown in Table 8-3.

A systematic improvement approach is required to address the needs of the region's bridges. It is important to provide routine maintenance to bridges in fair to good condition in order to prevent further deterioration and a possible weight restriction or closing. This should be combined with cost effective use of the limited funds available to rehabilitate or replace the bridges listed in Table 8-3.

Table 8-3 – Bridges with Weight Restrictions in the Pioneer Valley

Town	Br #	Over	Under	Weight Limit 2 Axle	3 Axle	5 Axle	Note
Amherst	A08001	HWY WOODSIDE AVE	OTHER BICYCLE PATH	0	0	0	Closed
Amherst	A08013	HWY MEADOW ST	WATER SWAMP BRK(ESTMN.BR	11	22	33	
Belchertown	B05002	HWY RIVER STREET	WATER SWIFT RIVER	7	10	15	
Belchertown	B05006	HWY BARDWELL ST	WATER JABISH BROOK	12	16	24	
Belchertown	B05023	HWY WILSON ST	RR NECRR MAINLINE	3	3	3	Closed
Belchertown	B05025	HWY COLD SPRN RD	WATER SWIFT RIVER	0	0	0	Closed
Belchertown	B05034	HWY ALDRICH ST	WATER JABISH BROOK	16	19	30	
Blandford	B-14-7	BLAIR RD	WHEELER BROOK	18	23	36	
Brimfield	B24009	HWY MONSON RD	WATER FOSKETT MILL STRM	7	10	15	
Brimfield	B24014	HWY W BR PLMR RD	WATER BLODGETT MILL BRK	17	25	39	
Brimfield	B24025	HWY HAYNS HILL RD	WATER MILL BROOK	18	23	36	
Brimfield	B24038	HWY DNHN PLMR RD	WATER BOTTLE BROOK	16	22	35	
Chester	C-11-4	HAMPDEN ST	WALKER BROOK	8	9	12	
Chester	C-11-20	GEORGE MILLER RD	MID BR WESTFIELD R	4	9	14	
Chester	C-11-23	SMITH ROAD	MID BR WESTFIELD R	5	5	5	
Chester	C-11-24	KINNE BK RD	MID BR WESTFIELD R	5	11	17	
Chester	C-11-26	OLD STATE RD	W BR WESTFIELD R	10	12	18	
Chester	C-11-45	BLANDFORD RD	WALKER BROOK	15	19	23	
Chesterfield	C-12-9	IRELAND ST	W BR WESTFIELD R	20	24	35	
Chicopee	C13012	ST116 CABOT ST	COMB CONN RIV & PVRR	14	16	23	
Cummington	C-21-6	RIVER RD	WESTFIELD BROOK	17	25	36	
Cummington	C-21-16	STAGE RD	MEADOW BROOK	15	21	31	
Easthampton	E05005	HWY GLENDALE ST	WATER MANHAN RIVER	12	15	23	
Easthampton	E05010	HWY TORREY ST	WATER NBR MANHAN RIVER	20	23	28	
Goshen	G-6-1	ROUTE 9	STONE BROOK	20	25	34	
Goshen	G-6-4	SHAW RD	SWIFT RIVER	15	17	23	
Granby	G09001	HWY BURNETT ST	WATER BACHELOR BROOK	15	17	27	
Granby	G09004	HWY ALDRICH ST	WATER BACHELOR BROOK	11	13	18	
Granby	G09008	HWY NORTH STREET	WATER BACHELOR BROOK	12	17	26	
Granville	G-10-6	SODOM ST	DICKINSON BROOK	13	15	23	
Hampden	H04001	HWY MILL ROAD	WATER SCANTIC RIVER	11	13	19	
Hampden	H04002	HWY SOMERS ROAD	WATER SCANTIC RIVER	10	11	15	
Hampden	H04003	HWY CHAPIN ROAD	WATER SCANTIC RIVER	12	14	20	
Hampden	H04010	HWY SCANTIC ROAD	WATER TEMPLE BROOK	15	18	29	
Hampden	H04011	HWY STAFFORD RD	WATER SCANTIC RIVER	16	21	33	
Hatfield	H11005	HWY CHESTNUT ST	WATER MILL RIVER	15	18	32	
Hatfield	H11028	HWY CHESTNUT ST	I-91	18	21	30	
Holland	H19009	HWY MARCY RD	WATER STEVENS BROOK	0	0	0	Closed
Holland	H19997	HWY OLD STFRD RD	WATER STEVENS BROOK	0	0	0	Closed
Holyoke	H21009	HWY APPLETON ST	WATER THIRD LEVEL CANAL	17	27	22	
Holyoke	H21012	HWY SARGEANT ST	WATER SECOND LEVEL CANAL	14	16	25	
Holyoke	H21013	HWY CABOT ST	WATER SECOND LEVEL CANAL	17	19	29	
Holyoke	H21014	ST141 APPLETON ST	WATER SECOND LEVEL CANAL	20	23	36	
Holyoke	H21018	HWY LYMAN ST	WATER FIRST LEVEL CANAL	12	20	26	
Holyoke	H21020	ST141 APPLETON ST	WATER FIRST LEVEL CANAL	20	23	36	
Holyoke	H21024	HWY LWR WSTFLD RD	RR R.V.R.R	16	22	34	
Huntington	H-27-8	ROUTE 112	POND BROOK	15	23	36	
Middlefield	M-19-3	TOWN HILL RD	FACTORY BROOK	14	16	23	
Middlefield	M-19-4	TOWN HILL RD	FACTORY BROOK	14	16	23	
Middlefield	M-19-5	BANCROFT ROAD	W BR WESTFIELD R	11	14	25	
Middlefield	M-19-8	CLARK WRIGHT RD	GLENDALE BROOK	12	16	24	
Monson	M27002	HWY CUSSHMAN ST	WATER CHICPEE BROOK	16	19	30	
Monson	M27010	HWY HOSPITAL RD	WATER CHICPEE BROOK	17	22	33	
Monson	M27011	HWY HOSPITAL RD	WATER QUABOAG STREAM	8	13	20	Closed
Monson	M27014	HWY HAMPDEN AVE	WATER CHICPEE BROOK	12	12	16	
Monson	M27015	HWY OLD WALES RD	WATER CONANT BROOK	16	22	33	
Monson	M27026	HWY STFFRD HLLOW	RR NECRR MAINLINE	15	21	32	
Monson	M27030	HWY BUNYAN RD	WATER CHICPEE BROOK	0	0	0	
Monson	M27031	HWY ROBBINS RD	WATER CHICPEE BROOK	0	0	0	
Monson	M27033	HWY MECHANIC ST	WATER BR CHICOPEE BROOK	0	0	0	
Monson	M27036	HWY BRADWAY RD	WATER HENDEE BROOK	0	0	0	
Monson	M27037	HWY BRADWAY RD	WATER SCANTIC RIVER	0	0	0	
Monson	M27038	HWY DICKENSON RD	WATER TWELVEMILE BROOK	0	0	0	
Monson	M27041	HWY MAPLE ST	WATER CHICOPEE BROOK	0	0	0	

Table 8-3 Continued - Bridges with Weight Restrictions in the Pioneer Valley

Monson	M27043	HWY HAMPDEN T RD	WATER TEMPLE BROOK	0	0	0	
Monson	M27044	HWY HAMPDEN TW R	WATER TEMPLE BROOK	0	0	0	
Monson	M27048	HWY WILBRAHAM RD	WATER TWELVEMILE BROOK	0	0	0	
Monson	M27053	HWY MECHANIC ST	WATER MARGARET BROOK	0	0	0	
Monson	M27054	HWY PECKS CRS RD	WATER CHICOPEE BROOK	0	0	0	
Monson	M27055	HWY ALD THRSHR R	WATER TEMPLE BROOK	0	0	0	
Monson	M27137	HWY WALES RD EXT	WATER VINICA BROOK	0	0	0	Closed
Monson	M27138	HWY ABANDONED RD	WATER MONSON RESOVOIR	0	0	0	Closed
Montgomery	M-30-1	MAIN RD	ROARING BROOK	18	21	31	
Northampton	N19023	HWY BLISS ST	WATER MILL RIVER	10	12	18	
Northampton	N19026	HWY MAIN ST LEED	WATER SLUICEWAY	15	21	31	
Northampton	N19027	HWY OLD SHEPHD RD	WATER MILL RIVER	3	3	3	
Northampton	N19033	HWY CHESTFLD RD	WATER ROBERTS MEADOW BRK	9	22	34	Closed
Northampton	N19035	HWY KENNEDY RD	WATER ROBERTS MEADOW BRK	15	21	31	
Northampton	N19037	HWY PARK HILL RD	WATER BASSET BROOK	17	22	33	
Northampton	N19047	HWY CLEMENT ST	WATER MILL RIVER	17	19	29	
Palmer	P01014	HWY E MAIN ST	WATER WARE RIVER CANAL	15	19	30	
Palmer	P01016	HWY CHURCH ST	WATER WARE RIVER CANAL	16	21	31	
Palmer	P01024	US 20 PARK ST	RR CSX MAINLINE	14	16	21	
Palmer	P01024	US 20 PARK ST	ST 67	14	16	21	
Pelham	P04006	HWY MEETINGHSE R	WATER AMETHYST BROOK	11	24	36	
Pelham	P04007	HWY MEETINGHSE R	WATER HARRIS BROOK	11	24	36	
Russell	R-13-7	OLD WESTFIELD RD	BRADLEY BROOK	16	19	27	
Southampton	S19006	HWY RUSSLVLLE RD	WATER MANHAN RIVER	14	16	26	
Southampton	S19010	HWY EAST ST	WATER MANHAN RIVER	10	11	19	
Southampton	S19011	HWY GUNN RD	WATER MANHAN RIVER	17	21	32	
Southampton	S19024	HWY VALLEY RD	WATER MOOSE BROOK	13	16	23	
Southwick	S22001	HWY LOOMIS ST	WATER MUNN BROOK	14	17	23	
Southwick	S22005	US202 & ST10	WATER JOHNSON BROOK	12	23	36	
Springfield	S24028	HWY ST JMES AVE	RR CONRAIL(ABANDONED)	14	19	29	
Springfield	S24066	HWY CHESTNUT ST	i291 CONN A B C D RAMP F	20	25	36	
Springfield	S24090	HWY ROOSEVELT AVE	RR CONRAIL SPURLINE	12	13	18	
Springfield	S24091	HWY ROOSEVELT AVE	RR CONRAIL MAINLINE	10	10	10	
Ware	W05006	HWY SOUTH ST	RR NECRR(SPUR)	16	18	26	Closed
Ware	W05008	HWY MALBOUEF RD	WATER FLAT BROOK	15	20	30	
Ware	W05011	HWY HARDWICK PND	WATER MUDDY BROOK	8	12	19	
West Springfield	W21011	HWY PROSPECT AVE	RR PVRR	11	15	22	
Westfield	W25006	US202 SOUTHWICK RD	WATER LITTLE RIVER	12	16	29	
Westfield	W25007	HWY GRANVILLE RD	WATER LITTLE RIVER	13	22	36	Closed
Westfield	W25009	HWY NORTHWEST RD	WATER LITTLE RIVER	0	0	0	Closed
Westfield	W25011	HWY POCHASSIC ST	COMB PVRR & ACCESS RD	6	6	6	
Westfield	W25021	HWY LOCKHOUSE RD	RR PIONEER VALLEY RR	8	8	8	
Westfield	W25032	HWY POCHASSIC ST	WATER MOOSE MEADOW BROOK	17	22	33	
Westhampton	W27002	HWY EASTHAMPTN RD	WATER NBR MANHAN RIVER	16	20	25	
Westhampton	W27004	HWY NORTH RD	WATER NBR MANHAN RIVER	14	19	33	
Westhampton	W27005	HWY KINGS HWY	WATER NBR MANHAN RIVER	8	11	16	
Westhampton	W27006	HWY KINGS HWY	WATER NBR MANHAN RIVER	8	11	16	
Westhampton	W27010	ST 66 MAIN RD	WATER SODOM BROOK	12	18	29	
Westhampton	W27018	HWY CHESTFLD RD	WATER BREWER BROOK	10	18	24	
Williamsburg	W-36-3	HEMENWAY RD	BANDFORD BROOK	11	15	24	
Williamsburg	W-36-11	BRIDGE ST	MILL RIVER	20	25	25	
Williamsburg	W-36-17	S MAIN ST	MILL RIVER	16	18	25	
Williamsburg	W-36-18	SKINNERVILLE RD	MILL RIVER	7	17	27	
Worthington	W-45-11	RIVER ROAD	MID BR WESTFIELD R	17	24	35	
Worthington	W-45-12	RIVER ROAD	MID BR WESTFIELD R	15	22	34	
Worthington	W-45-13	RIVER ROAD	MID BR WESTFIELD R	10	12	19	
Worthington	W-45-15	ROUTE 112	WARDS STREAM	19	23	36	

b) Regional Pavement Management System

Routine maintenance activities have not kept pace with the deterioration of our transportation investments. Public dollars must be directed at the preservation of the existing infrastructure now more than ever. Priority for maintaining the existing system requires a more efficient use of capacity, enhanced safety and travel conditions and efficient use of limited funds.

Figure 8-1 - Pavement Management System Findings - Current Condition (1996)

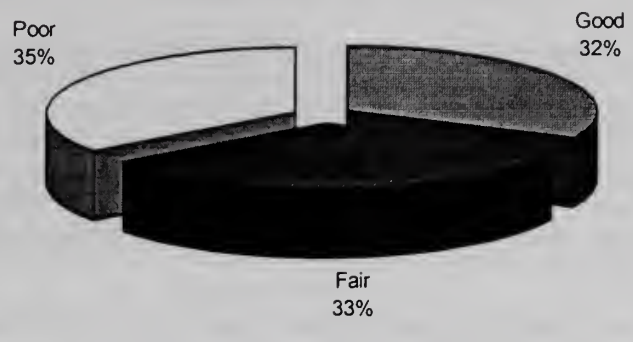


Figure 8-1 shows the percentages of surveyed federal aid roadways in the Pioneer Valley for each condition category. Roads in "Poor" condition have a pavement condition index (PCI) of below 65. Roads with a PCI of 65 to 85 and 86 to 100 fall into the "Fair" and "Good" categories respectively. Best management practices suggest that roadways be refurbished before they reach poor condition because it is the most cost effective way to maintain pavement. It requires far more money to stabilize the overall condition of a road network, when even a small portion of the road reaches a condition of major investment (reconstruction or rehabilitation) than to attend to preventive and routine maintenance. Priorities arising out of the pavement management system target roads in poor condition for obvious reasons, but it also recommends significant outlays for roads in the fair category. The usable lifespan of a roadway is maximized if refurbishment occurs at this stage of deterioration.

4. Design Standards

Design standardization is an effective way to ensure that highways have adequate capacity levels compatible with the service they provide. The highway functional classification system was updated so that all federal-aid roadways would be consistently classified based on serviceability. Using this classification system, FHWA and MHD adopted standard roadway designs that suit the capacity and safety needs of each roadway class.

For infrastructure that is presently substandard, standardization is expected to be achieved when reconstruction or rehabilitation improvement is scheduled. Communities that prefer deviations from the accepted design standards may request a waiver from the state and/or federal agencies. Typically, this results in minor adjustments to the roadway design if justified. The local communities also have the option to forgo funding assistance and improve the facility through local funding sources. Also, in instances where a corridor is designated a scenic byway, design standardization may be less stringent to maintain the scenic character of the area as long as safety conditions are not sacrificed

5. Vehicle Emissions

The Clean Air Act Amendments (CAAA) of 1990 require that all areas that fail to meet the National Ambient Air Quality Standards (NAAQS) for Ozone develop a plan that will reduce overall emissions levels. Dependency on automobiles in the region has hit an all-time high. Nearly 80% of all work trips and a greater percentage of other trips are now performed with automobiles. Urban sprawl, low

gas prices, and the increase in "*two worker households" are* three of the main reasons for this trend. It will be critical for air quality and the overall health of the residents of the region, to use both direct and indirect methods to reduce the dependency on automobiles. It has become necessary to emphasize planning better developments, increased use of alternative modes and increased education on the drawbacks of driving if we are going to be successful in reducing emissions.

6. Access

The key to being economically successful is establishing and/or maintaining adequate access to the natural, economic, social, historic, and cultural resources of the Pioneer Valley. As the location of the crossroads of Interstates I-90 and I-91 within the Valley's boundaries makes inter-regional and interstate travel very accessible. Likewise, the region's proximity to Bradley International Airport, Northeast Corridor Amtrak service, the network of arterial and rural roads, transit systems and bicycle and pedestrian ways ensure physical access to educational institutions, military installations, unique regional historic and cultural resources, beautiful recreational areas and business and retail centers throughout the region.

Providing adequate physical access to the region's resources does not, however, necessarily guarantee that they will be recognized and/or used to their full potential by the residents of, or visitors to, the region. Informational access is also important in moving people throughout the region and assisting them in accessing the resources available in the Pioneer Valley. Chambers of Commerce, tourist information organizations and brochures all enhance access to Pioneer Valley sites and activities.

7. Intelligent Transportation Systems

In January of 1997, MassHighway Planning with the cooperation of the PVPC, solicited the assistance of a consultant to conduct an Intelligent Transportation Systems (ITS) Strategic Deployment Plan for the Metropolitan Springfield and Pioneer Valley Region. The project developed a plan of recommended ITS strategies and applications for the Pioneer Valley as well as a regional architecture to identify the various transportation management systems and the linkages between these systems. Finally the plan provides information to insure future ITS applications for the Pioneer Valley are compatible with the National Architecture for ITS as developed by the U.S. Department of Transportation.

A total of 17 different projects are identified and prioritized as part of the Strategic Deployment Plan. These projects are summarized in Table 8-4.

As shown in Table 8-4, the number one ranked ITS project for the Pioneer Valley region is an Advanced Traveler Information System for the Route 9/Calvin Coolidge Bridge reconstruction project. As currently proposed, an emergency vehicle pre-emption phase will be added to three traffic signals in the vicinity of the bridge. These three signals in turn will be linked to a Regional Traffic Operations Center to be staffed by MassHighway District 2 and the Massachusetts State Police. Operations center staff through radio contact with local police and fire departments can utilize the pre-emption phase to clear the bridge of traffic for approaching emergency vehicles. Variable message signs will be strategically placed in the vicinity of the project to provide project status information on existing delays and incidents, as well as proposed alternate routes, if available. The traffic operations center will remain upon completion of the Route 9 project.

Table 8-4 – ITS Projects Defined in the Strategic Deployment Plan for the Pioneer Valley Region

Proposed Project Name	Objective	Lead Agency
Route 9 Corridor Advanced Traveler Information System	Traffic management and incident management during construction	MassHighway
PVTA Transit Information System	Gather and provide real time transit information	PVTA
Incident Management Coalition	Provide interagency coordination to support incident management requirements	MassHighway/ Mass State Police
Regional Traffic Operations Center	Provide focus for management, coordinate operations and communications	MassHighway
Regional Bridge Monitoring and Incident Management System	Provide traffic and incident management capabilities for bridges.	MassHighway
Interstate 91 Corridor Incident Management System	Provide ITS capabilties for management of incidents along I-91.	MassHighway
Real-Time Regional Traffic Control Signal Systems	Mitigate pockets of congestion through improved coordination of traffic signals.	MassHighway/ municipal agencies
Traffic and Transit Stop Video Surveillance	Provide video surveillance in urban areas for traffic management and personal security.	PVTA/ municipal agencies
PVTA Transit Stop Information System	Provide transit users with information about the bus network and estimated time of arrival of the bus.	PVTA
Multi-modal Regional Traveler Information System	Allow Springfield are travelers access to traffic and transit information	MassHighway
PVTA Automatic Vehicle Location System	Optimize fleet management and provide real-time transit information system.	PVTA
Advanced Parking Management	Optimize the use of available parking spaces	Municipal agencies
Regional Integrated Fare Collection System	Automate and integrate fare and fee collection mechanisms to reduce cost and capture lost revenue	MassPike, PVTA and others
Rail Crossing Management and Control System	Improve safety at rail crossings.	To be determined
Wide Area Traffic and Transit Management	To use ITS applications for purposes other than their main intent, i.e. use AVL data to estimate travel times.	MassHighway
Commercial Vehicle Pre-clearance and Control – Interstate Crossings	Provide electronic credentials and clearances for checked vehicles.	Multi-Agency
Advanced Mayday System and Rural Incident Management System	Detect and respond to rural incidents	MassHighway

Source: Intelligent Transportation Systems Strategic Deployment Plan for the Metropolitan Springfield and Pioneer Valley Region.

Other ITS Applications in the Pioneer Valley include:

- The Pioneer Valley Transit Authority has recently added "Smart-Card" technology to the bus fleet. Passengers, now have the option to purchase a card from which the bus fare is deducted during boarding. While convenient, the PVTA can also track Passenger information on the type and frequency of routes being used.

- The Massachusetts Turnpike recently introduced its "Fast Lane" Program at all toll facilities. Motorists which apply for an account receive a "transponder" enabling them to drive through designated toll lanes without stopping. The appropriate toll is automatically deducted from the user's account. Special transponders, valid only for the toll-free exits 1 – 6, are available free-of-charge to Western Massachusetts residents. The Fast Lane is also programmed to work with other express toll programs such as New York's "EZ Pass" system.

- In 1998, a Regional Incident Management Coalition was established for the Pioneer Valley Region. One of the goals of this coalition was to develop an Incident Management Handbook for Interstate 91. Draft diversion plans were developed; however, the project was never completed. The Pioneer Valley Incident Management Coalition work should be revisited in the near future to complete the I-91 Incident Management Handbook as proposed in 1998.

- The Massachusetts Highway Department in conjunction with the Federal Highway Administration, the Office of Representative John Olver, the Franklin County Chamber of Commerce, and the Franklin County Regional Council of Governments contracted with a private partner to develop, operate and maintain a Traveler Information Service for the Route 2 Corridor of Central and Western Massachusetts. The two principal goals of this project are to increase tourism and enhance motor safety through the provision of traveler information. As part of the project, informational kiosks are proposed for several locations in the study area. The PVPC is involved with the working committee for this project as the study area extends into the northern half of Hampshire County.

It is anticipated that future ITS applications will be joined with future construction activities and link into existing ITS applications. The following presents additional areas in which ITS is expected to play a role in the future in the Pioneer Valley Region.

- Additional information is required to support the Regional Traffic Operations Center at MassHighway District 2. As the Route 9 Advanced Traveler Information System comes online, it is important to obtain additional data to validate the traffic simulation model developed for the corridor. Current data will ensure that the most effective methods are being employed to mitigate congestion during construction. In addition, it will also be important to consider the future expansion of the model to account for other construction projects and ITS applications in the region.

- A study should be conducted to evaluate and prioritize the most effective methods to disseminate traveler information for the Route 9 corridor to the public. Potential methods include a dedicated web-site, the local media, highway advisory radio, or a combination of different methods. The study should also evaluate the potential for linking into other traveler information systems such as the one proposed for the Route 2 corridor.

- The opportunity exists to expand upon the Route 9 Advanced Traveler Information System along the I-91 Corridor into Springfield. One possibility includes incorporating ITS applications into the proposed I-91 Ramp Reversal Project for Springfield. Under ideal circumstances, the project would feed traveler information into the Regional Traffic Operations Center which could then be broadcast to the general public via a dedicated information provider. Additional links could be provided to the Visitors Center proposed as part of the Basketball Hall of Fame expansion project and the Union Station Intermodal Center.

B. TRANSIT AND PASSENGER TRANSPORTATION

1. Maintaining and Increasing Ridership on Fixed Route Service

After showing modest declines in ridership from 1985 to 1990, the public transit system in the Pioneer Valley has rebounded with ridership improvements over the past few years. However, ridership declined slightly (1.7%) in 1999. This trend must be reversed going into the new millennium. Numerous studies conducted by PVPC have shown that the majority of PVTA riders are what we call "captive" riders. Meaning that they do not have any other means of transportation. For ridership to increase in the PVTA system programs must be initiated that bring in new riders. We must make riding the bus a viable alternative to driving a car. In the 90's the entire PVTA bus fleet was replaced with new buses. The PVTA went from having one of the oldest fleets in the country to having one of the newest. A new farebox system was installed on all PVTA buses, improving headways (decreasing the time between buses on a specific route), and re-routing to better serve major trips generators have been priorities. In response to numerous requests by the riding public service has been expanded to both late night and Sundays. This expanded service will enable PVTA meet its goal of providing service seven days a week covering three work shifts. To compete successfully with automobile transportation, it will be necessary to sustain these efforts and implement new innovations, as they become available.

In the spring of 2000 a survey is planned for the entire PVTA fixed route system. The study will poll the ridership for their thoughts on a number of key transit issues. The specific issues have not been chosen as of the printing of this document but in general, we will be looking for demographic information, trip purpose, car ownership, number of times PVTA is ridden during week and other information that we deem as important to help us gain some insight into the typical PVTA rider.

2. The Decrease of Operating Subsidies

Currently, operating funds for the PVTA come from six sources: 5% from the FTA, 48% from the Commonwealth, 27% from the farebox, 19% from their member communities, and less than a percent each from earned interest and advertising. Nearly all of these sources of revenue are shrinking or have been capped and it is becoming increasingly difficult to expand transit. PVTA with the assistance of PVPC has become more creative in securing funding for new projects. The use of "one-time" or "short term" grants is being used to fund additional trial service. A Transportation Demand Management (TDM) grant was obtained to expand service into Palmer this past year. A similar grant was received to expand service in the University of Massachusetts area. Specifically the Minute Man Express which brings fixed route transit service to Sunderland and Deerfield via Amherst.

In areas like the Pioneer Valley, transit is deemed more of a public service for the transportation disadvantaged than an actual commute option. A greater commitment must be made to transit as a commute option, if our goals of fewer vehicle miles, lower emissions, and improved environmental quality of our transportation system are to be achieved.

3. Accessibility

The Americans with Disabilities Act of 1990 (ADA) was enacted on July 26, 1990 and it provides a comprehensive framework and approach for ending discrimination against disabled individuals. As of July 1995, PVTA entered full compliance with the ADA law meaning that they have adhered to all accessibility regulations required of them. The new bus fleet is 100% ADA accessible.

During the development of past RTP's, a substantial number of comments received raised the issue of accessibility for the elderly and disabled residents of the Pioneer Valley, especially the elderly. To be eligible for ADA paratransit service, one must submit an application and documentation from a physician for some sort of disability - mental or physical, permanent or temporary. Age, however, is

not one of the criteria for establishing a disability under ADA eligibility requirements. Therefore, many elderly persons are unable to access paratransit systems because they are ineligible under ADA. The PVTA, the largest paratransit provider in the region, makes every effort to accommodate non-ADA eligible seniors, but capacity is limited because PVTA, by law, must first use its fleet of vehicles to satisfy the transportation needs of its ADA eligible users. The overriding problem in this issue is the sheer expense of providing "door to door" paratransit service. The average paratransit trip (per unit) can cost between $4.50 and $15.00 depending on trip distance. That is two to ten times more expensive than providing these trips on the fixed route transit system. Efforts to accommodate more non-disabled elderly are continuing through more efficient use of the current paratransit fleet, subsidization of other local providers, and greater use and coordination of the fixed route transit system.

4. Intermodal Coordination

The Springfield Bus Terminal is currently the only true passenger intermodal center in the Pioneer Valley. Connections between intercity carriers, like Peter Pan Bus Lines, and the PVTA can be completed between 6 AM and 1 AM at the facility. Amtrak is accessed on Lyman Street which is several blocks away from the terminal and is therefore, not convenient for bus passengers to transfer to and from train service. Peter Pan does offer frequent service to Bradley Airport.

In the previous edition of the Regional Transportation Plan the revitalization of Union Station in Springfield was discussed as an intermodal terminal to serve the Pioneer Valley. We are pleased to report that construction began on Union Station in the fall of 1999. The estimated completion date of the complex is the year 2003. Once this project is completed Springfield will have a true intermodal terminal complex that will serve virtually all transportation modes available in the Pioneer Valley and beyond. Union Station will combine transportation services for commuter rail, Amtrak, local and intercity buses, taxis, shuttles, automobiles, bicycles, and pedestrians. Support services for ticketing, related retail space, food kiosks and restaurants, offices and museums are all planned for the new facility.

5. Intercity Bus Services

Intercity bus service to and from the Pioneer Valley is quite extensive. Companies like Peter Pan, Greyhound and Vermont Transit, provide bus services to cities throughout New England and beyond. Peter Pan, for example, offers hourly service between the Pioneer Valley and Boston every day. As congestion increases and poses more of a problem for intercity travelers, it is in the best interest of the region to promote these services as a viable alternative to the automobile.

6. Welfare Reform Transportation

a) Access to Jobs

The "Access to Jobs" program is collaborative effort between the Executive Office of Transportation and Construction (EOTC) and the Department of Transitional Assistance (DTA). State funds allocated to the DTA's emergency Support Program have been transferred through an Interagency Service agreement to 13 Regional Transit Authorities (RTAs) including PVTA. The program provides a coordinated system of information, transportation problem solving, training on how to access the fixed route system, and immediate transportation services to DTA clients moving into the labor force.

Access to Jobs provides a variety of efficient, cost effective modes of commuting to work, which are free to the new employee – eliminating transportation as a barrier. The ultimate goal of the transportation professionals assisting DTA clients is to educate the client and make them self sufficient in commuting to and from work. A network of transportation professionals is located

throughout the state to help solve the client's transportation needs. PVPC's role in this process is to meet with PVTA staff and the fixed route operator and try to make the fixed route system a better fit to the DTA client's needs. Routes are modified when possible to accommodate the DTA client.

Current or former welfare recipients who are transitioning into the workforce are eligible for transportation. The local DTA office or its designated vendors must certify eligibility prior to using any of the Access to Jobs services. Former recipients who were working when their case closed or who began employment anytime between the case closing and the 12 months immediately following the closing date are eligible for a Decrease of Operating Subsidies.

7. Passenger Rail

Amtrak is under a congressional mandate to be self sufficient in terms of operating cost by 2003. Unlike previous efforts to control costs, Amtrak has taken aggressive moves to increase business by adding services, focusing on customer satisfaction, and soliciting mail and express business.

One element of new Amtrak initiatives that is close to the region is the start of Acela Express high-speed rail service between Boston and Washington. This service has been delayed over a year as a result of a number of technical issues with the new trains but is expected to begin on December 11, 2000. How this new service will effect this region is still to be determined as it will likely take a year or more for the Acela service to be fully implemented and other changes made to Amtrak's operation.

a) Pioneer Valley Routes

The recent effort to limit the amount government operating assistance required by Amtrak has resulted service cut backs that occurred in previous efforts. During the last round of major system cutbacks two of the regions Amtrak trains were seriously threatened with elimination. In both cases local and state efforts where successful in influencing Amtrak's decision-making process and the trains remained.

b) Express and Mail

In addition to providing passenger service to the Pioneer Valley, Amtrak has long provided mail movement service to the Springfield Bulk Mail Center. In 1999, Amtrak opened an express facility near Union Station off of Columbus Avenue in Springfield. This new facility allows for the loading of intermodal road-railer trailers. The new service provides an additional means of transporting goods to and from the region.

C. TRANSPORTATION OF GOODS

1. Trucking

Maintaining the efficient movement of goods is critical to economic stability and trucking plays a major role. A delicate balance must be maintained between economic vitality through the movement of goods, free enterprise, damage to the highway infrastructure, governmental regulation and truck safety. Two specific items that need further study are:

- There are numerous exits along I-91 that are half-interchanges with Route 5/Route 10. These half interchanges cause trucks to detour through residential and business areas, adding to roadway congestion, and increasing transportation costs.

- The need for a better connection between the Palmer Intermodal Terminal and the Mass Pike. If an improved connection were built, trucks coming from New York State could follow the Mass Pike to

the new connection rather than exiting the New York Thruway in New York and traveling along local roads to Pittsfield.

- Currently the CSX intermodal Yard in West Springfield is only accessible from the north side of the CSX mainline in West Springfield. There are three underpasses under the main line that would allow for access from the south but all have restrictive 12' foot clearances. Improving the clearances on one or more of these underpasses would allow for improved access from the southern parts of the region as well as from Connecticut.

2. Railroads

Perception of the regions freight railroads by local businesses is not positive. A recent survey of larger local business by the local economic development organization had railroads ranked second to last in customer satisfaction. Additional efforts are required to promote the diversity of rail operations in the Pioneer Valley region.

3. Air Freight Access

Air cargo can be broken down into three specific groups: Air freight which includes all types of goods (generally over 70 pounds) transported by air and Express, which includes packages and documents (generally under 70 pounds) transported by air. Air express frequently offers comprehensive pick-up and delivery services, such as those provided by Federal Express; and U.S. and foreign mail travelling by air. The focus of this section will be on air freight and package express.

Air freight and package express services are readily available in the Pioneer Valley Region, and the transportation of air cargo is generally conducted in one of two ways. The first option would be to transport air freight by companies which own and maintain their own all-cargo aircraft fleet, such as Airborne Express, Burlington Air Express and Emissary Airways Inc. The second option, and the primary method for moving most of today's air freight, is via scheduled passenger aircraft for which the shipper places the cargo with a freight forwarding (pooling) company. And the forwarder contracts for blocks of space on commercial airlines for specific routes.

Air freight in the Pioneer Valley Region is predominantly moved through either Bradley International Airport in Windsor Locks, Connecticut, Logan Airport in Boston, or New York City's metropolitan airports. None of the airports located within the region's boundaries offer air cargo services at this time.

a) Bradley International Airport

Bradley International Airport is a medium-hub airport located 15 miles southwest of Springfield, MA, in Windsor Locks, CT. It is the major commercial airport serving the Pioneer Valley for both passenger travel and air cargo shipments. Bradley's convenient location near Interstate 91, and its improved and expanded air cargo facilities, make it the primary choice for the regions shippers. However, airport choice for air cargo transport is dependent on a number of factors, including destination coverage/schedule factors, tariff structure, logistical and contractual considerations, and access time and distance of individual airports. Therefore, some of the region's shippers may choose Boston's Logan airport, or one of New York City's metropolitan airports for air cargo services.

Scheduled all-cargo flights are available at Bradley through a number of different carriers and there is a current listing available from the Connecticut Department of Transportation Bureau of Aviation and Ports. A current listing of passenger flights that make space available for freight forwarders can also be obtained from the Bureau.

b) Westover Metropolitan Airport

The Westover Metropolitan Airport provides access to a large joint military/civilian air facility which served exclusively as a military Strategic Air Command (SAC) base until 1974. At that time the base was deactivated and reclassified as an Air Force Reserve base. Today, in addition to the Air Force Reserve facilities, three industrial airparks are located at Westover.

D. AVIATION

1. Air Passenger Service

The Capital Region Council of Governments (CRCOG) is currently in the process of conducting a transportation study focused on movement of people and goods in and around Bradley International Airport. The Pioneer Valley Planning Commission is a partner in this study and is focusing on the short and long-range access needs from the Pioneer Valley to and from the airport. Recommendations from this study specific to the Pioneer Valley will be incorporated into future versions of the RTP.

E. NON-MOTORIZED TRANSPORTATION

1. Public Support

Bicycling and pedestrian needs in the region are assessed in the Pioneer Valley Bicycle and Pedestrian Plan. The Plan includes information and recommendations on incorporating bicycle and pedestrian features into road reconstruction projects, using zoning and development tools to help create environments that support bicycling and walking, increasing bicycle and pedestrian safety, and promoting bicycling and pedestrian activities as alternative transportation choices.

The main purpose of the plan is to guide development in the Pioneer Valley region in ways that encourage and facilitate bicycling and walking as transportation options. Community interest in the Pioneer Valley Region has strongly supported the creation of off-road, multi-use trails, bike lanes, and wide curb lanes for bicyclists. These off-road and on-street projects allow for easy access into residential neighborhoods and central business districts; are suitable for making short, local trips; can be incorporated into road resurfacing and reconstruction projects for cost savings.

Trail projects are seen by the riding public as a separate and distinct system from the existing transportation network and, therefore, are more popular than road and street facilities. Road and street facilities are seen as unsafe to novice cyclists because of the close proximity to traffic. The plan recommends improvements to roadways for bicyclists, in addition to expanding the off-road network. By improving the safety on-road facilities, both on-road and off-road facilities can be viewed as a system and more of a viable commute alternative to driving.

2. Funding

a) Legislature

Since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, the federal government has played a historically unprecedented role in promoting walking and bicycling. In his introduction to the National Bicycling and Walking Study, then-Secretary of Transportation Federico Pena stated, "We (The United States Department of Transportation) want to improve mobility by promoting strategies that give people more choices ... especially by making better connections to public transit and by providing safer ways to bicycle and walk. The goals of the National study are: to double the current percentage (from 7.9 percent to 15.8 percent)

of total trips made by bicycling and walking, and to simultaneously reduce by 10 percent the number of bicyclists and pedestrians killed or injured in traffic crashes." Federal regulations, plans, policy statements and planning guidelines issued since 1991-- including the latest transportation law, the Transportation Equity Act (TEA 21) -- continue to support walking and bicycling as important transportation choices that should be available to all Americans who want them. The reality of TEA-21 is that pedestrian and bicycle projects can be funded with almost all sources of federal transportation dollars (see the Appendix for an explanation of the mechanics of the final funding loop for MassHighway federal aid projects).

Federally funded transportation projects (including bicycle and pedestrian projects) are prioritized in the region through the Transportation Improvement Program (TIP). This annually updated document matches available federal funds with local projects. The Region's Joint Transportation Committee prioritizes projects for TIP. Since the beginning of ISTEA the JTC has programmed $12,178,279 for bicycle and pedestrian projects. This amount is in addition to the sidewalks, roadway shoulders, crosswalks and transit shelters constructed as part of regular roadway and transit improvement projects.

23USC 217 (e): In any case where a highway bridge deck is being replaced or rehabilitated with Federal financial participation that is located on a highway, other than a highway access to which is fully controlled, on which bicycles are permitted to operate at each end of such bridge, and the Secretary determines that a safe accommodation of bicycles can be provided at reasonable cost as part of such replacement or rehabilitation, then such bridge shall be so replaced or rehabilitated as to provide such safe accommodations. Title 23 of the United States

b) Potential Funding Assistance For Bicycle and Pedestrian Facilities

The following is an outline of potential federal and state funding sources for bicycle and pedestrian activities. They are presented by activity and eligible source of funding and are followed by a description of each funding source. *Sources marked with an asterisk (i.e. STP*) are part of the Transportation Equity Act for the 21st Century (TEA-21) of 1997. Only bicycle and pedestrian facilities principally used for transportation rather than recreation purposes are eligible for TEA-21 funds.*

According to the Metropolitan Planning regulations, projects seeking state or federal funding must be included in the Regional Transportation Plan (RTP) and the Transportation Improvement Program (TIP) to be considered for funding.

Table 8-5 - Funding Sources for Bicycle and Pedestrian Activities

Activity Assistance	Source of Funding
Brochures related to safe bicycle use	STP*, CMAQ*
Construction	NHS*, CMAQ*, STP*, STP/E*, DCS-Urban Self Help, L&WCF
Easement acquisition	DCS - Urban Self Help, L&WCF
Land acquisition	DCS - Urban Self Help, L&WCF, STP/E*
Planning or design	DCS - Self Help, DEM Greenways
Public service announcements related to safe bicycle use	STP*, CMAQ*
Route maps related to safe bicycle use	STP*, CMAQ*
Transit access and other facilities (lockers and racks)	Federal Transit Section 5309*

c) Description of Funding Sources and Other Areas of Assistance:

Congestion Mitigation and Air Quality (CMAQ)* Program Funds - "may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as brochures, public service announcements and route maps) related to safe bicycle use."

Massachusetts New and Innovative Transportation Demand Management Program (TDM) Funded under the Congestion Mitigation and Air Quality program, the TDM program is a $1.8 million statewide program that provides funds for low-cost, new and innovative TDM projects. The goals of the program are to help the Commonwealth achieve its air quality and traffic congestion objectives (State Implementation Plan) by changing the behavior of motorists, encouraging them to use alternatives to driving alone and supporting strategies that promote the use of these alternatives. Bicycle and pedestrian projects previously funded under this program include; PVTA's Rack & Roll Program (includes bicycle lockers, bicycle racks on buses, and bicycle parking racks) and Northampton's Sheldon Field Park & Ride Project (includes bicycle lockers and parking racks). Other examples of bicycle and pedestrian strategies that may be eligible for funding under this program include:

- Developing new shared ride services, including bike and ride services;
- Making transit more attractive through operational improvements;
- Developing programs that encourage the use of alternative modes, or reduce psychological impediments to their use;
- Devising alternative work hours;
- Implementing parking management strategies;
- Disseminating information and marketing alternatives.

Section 5307 Transit Funds - The funds are channeled through the regional transit agencies and are used for capital expenditures. Transit authorities can work with their member communities to develop pedestrian and bicycle friendly transit stops or add bicycle racks to buses.

Department of Environmental Management (DEM) - has the ability to acquire abandoned rights-of-way.

Department of Environmental Management Greenways Program (DEM Greenways) - has a small grants program for the planning and development of non-bike related trails.

Division of Conservation Services Self Help Program (DCS - Self Help) - reimburses up to 70% of the total project cost for the acquisition of land for conservation and passive recreation purposes.

Division of Conservation Services, Urban Self Help (DCS - Urban Self Help) Program - reimburses up to 70% of allowable costs towards the acquisition of land, undertaking of new construction or rehabilitation of land for park or outdoor recreation purposes.

Federal Lands Highway Funds - "may be used to construct pedestrian walkways and bicycle facilities in conjunction with roads, highways and parkways at the discretion of the department charged with administration of such funds."

Federal Land and Water Conservation Fund (L&WCF) - reimburses projects up to 50% of the total project cost, up to $150,000 for the acquisition, development or renovation of park, recreation and conservation areas.

Federal Transit Title III, Section 25* Funds - "allows transit funds to be used for bicycle and pedestrian access to transit facilities, to provide shelters and parking facilities in or around transit facilities, or to install racks or other equipment for transporting bicycles on transit vehicles."

Governor's Highway Safety Bureau (GHSB) Funds - "can be used for small scale physical improvements and bicycle safety programs."

Massachusetts Highway Department (MHD)* - can fund projects designed primarily for transportation. Priority is given to projects that have engineering design completed and all permits acquired by the impacted community(s).

National Highway System (NHS)* Funds - "may be used to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System (other than the Interstate System)."

National Park Service (NPS) Rivers and Trails Assistance Program - provides staff services to groups for organization building, education, planning and technical assistance. There are no direct funds available.

National Recreational Trails Funds (NRTF)* - may be used to create trails for use by motorized and/or non-motorized users. Funds under this category are very limited.

Surface Transportation Program (STP)* Funds - " may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as brochures, public service announcements and route maps) related to safe bicycle use."

Transportation Enhancements (STP/E)* Funds - may be used for " provision of facilities for bicyclists and pedestrians" and "preservation of abandon railway corridors (including the conversion and use thereof for pedestrian or bicycle trails)."

(i) Local Funding Sources

Bicycle Registration Fees - Communities can establish a bicycle registration program which charges a fee for each bicycle registered. The revenue from the fees can be earmarked for bicycle-related projects and services.

Sidewalk Accounts - Communities can obtain funding for sidewalks using municipal bonds or special accounts established to hold contributions from developers of new developments. Rather than requiring sidewalks in places that may not need them, a developer can be asked to donate what would have been spent to the special municipal account for sidewalks. The community can then use the funds for sidewalks where the are needed.

Environmental Impact Review Measures - Localities can ask project proponents whose projects have environmental impacts to consider bicycle and pedestrian improvements as mitigation measures.

Local Support through Volunteers, Schools, Business Groups - Although not a funding source, volunteerism is one of the greatest resources available to cities and town. There are civic clubs, schools, police departments, bike shops, bike accessory manufacturers, medical professionals, youth groups, service organizations, bicycling clubs, and business groups who are willing to take on projects to improve community public space or assist in injury prevention programs. Success

in bringing volunteers together is witnessed through adopt a trail groups, local bicycle advisory committees, and bicycle safety programs. (Resource: Community Bike Safety Idea Bank, MA Department of Public Health, Western MA Safe Kids, Kawanis Pediatric Trauma Institute (Guide to Bicycle Rodeos)

Baystate Roads Program - Not a funding source, The Baystate Roads Program provides public works and engineering staff of local governments and municipalities with information and training on current design practices, and technologies for managing public investments in local roads, bridges, sidewalks, and structures. The Baystate Roads Workshops are provided through a cooperative effort of the Federal Highway Administration, Massachusetts Highway Department, and the University of Massachusetts. (Baystate Roads Program 413-545-5403)

(ii) Other State Funding Programs

Community Development Block Grants (CDBG) - The Executive Office of Communities and Development (EOCD) awards CDBG funds that are appropriated by the federal government. Communities must apply for the grant. The CDBG funds can be used for many different projects and can be used as incentives to property owners and developers if approved by the municipality.

Municipal Incentive Grants - The Commonwealth of Massachusetts Executive Office of Communities and Development offers grants to communities for planning projects.

Public Works Economic Development Program Grants (PWED) - The State established this fund for assistance to communities in the design and construction/reconstruction of roadways, sidewalks, lighting systems, bridges, traffic control and service facilities, drainage systems, and other transportation related projects deemed by a municipality to be necessary for economic development. Municipalities must petition the Executive Office of Transportation and Construction (EOTC) which reviews projects according to set criteria.

3. Safety

Clearly people do walk and bicycle in the Pioneer Valley, and unfortunately they are also injured and killed in crashes with motor vehicles. Analyzing crash data as a way of documenting pedestrian and safety concerns can be misleading. Areas with very low crash rates may simply be places where it is so dangerous (or perceived to be so) to walk or ride a bike that no one does it. This is not the case throughout the Pioneer Valley, but it may be true in some neighborhoods and communities.

Raw numbers of crash victims help to document a problem. To prevent crashes, one needs to understand what causes pedestrian and bicycle crashes. We do not know this at the regional level, but individual municipalities can create an understanding of their bicycle and pedestrian crash problems by analyzing police accident report forms and hospital records. Police accident report forms include crashes between motor vehicles and bicyclists and pedestrians. Hospital records supplement a community's understanding of their bicycle crash problem as they include crashes that do not involve motor vehicles. Nationally, most bicyclists are injured in events that do not involve motor vehicles; however, the most severe injuries generally occur in crashes with motor vehicles.

There are four ways to make pedestrians and bicyclists safer:

- Change the physical environment in which they function, by adding crosswalks, bikelanes, signs, and other physical improvements;

- Provide them with protective gear, such as bicycle helmets, so if they are involved in a crash, they will be less likely to be injured;

- Educate bicyclists, pedestrians and motorists about sharing the road with each other;

- Enforce traffic laws that require motorists to yield to pedestrians and require bicyclists and motorists to share the road safely.

F. ENVIRONMENTAL AND LAND USE

1. Air Quality

The State of Massachusetts is classified as a serious non-attainment area for ozone. Another major air pollutant of concern is carbon monoxide (CO). The City of Springfield, the only CO non-attainment area in the Pioneer Valley, is classified as a serious non-attainment area for CO. These non-attainment classifications require Massachusetts to conduct transportation planning activities that consider air quality pollution levels and target the reduction of vehicle emissions throughout the state.

ISTEA requires that at least all transportation projects built with federal funds, such as those administered by the Federal Transit Administration (FTA), or with approvals from the Federal Highway Administration (FHWA), must come from a transportation plan and program that conforms with the CAAA of 1990 and the State Implementation Plan.

The pollutants, Volatile Organic Compounds (VOC), Nitrogen Oxides (NOX), and Carbon Monoxide (CO), react together in conjunction with warm temperatures, humidity, windspeed and sunlight to produce ozone (O_3). In Massachusetts excessive In Massachusetts excessive O_3 levels have occurred in the summer months, thereby, requiring emission inventories for these compounds in tons per summer day (TPSD). Similarly, excessive CO emissions have occurred in the winter at various locations during the months November through March, requiring an emission inventory for CO in tons per winter day (TPWD). These emissions are at their highest during the winter due to vehicle cold starts. During a cold start the engine temperature affects its combustion efficiency. Incomplete combustion of fuel causes compounds such as CO to be emitted into the air.

VOC emissions originate from various sources such as fuel combustion processes, on and off-road mobile sources, biogenic sources and various solvent processes. CO and nitrogen dioxide (NO_2) emissions, key components of NOx, originate from fuel combustion by on and off-road mobile sources as well as stationary sources. Emissions such as VOC are transferable depending on weather conditions and geography of the land. In Western Massachusetts, emissions generated in areas to the south, such as New York City and New Jersey, are transmitted via prevailing winds. This type of emissions displacement can intensify adverse conditions within a region of relatively low emission levels. Similarly, areas to the north of Massachusetts experience the displacement of emissions generated in the Commonwealth.

2. Water Quality

Water quality and land use are closely related. Human activities related to the development and use of land can pollute water supplies through the intentional or accidental release, or discharge, of potential pollutants. Pollutants can run-off the surface of the land and enter surface water supplies, lakes, streams, ponds, and rivers. Pollutants can also leach into the ground and contaminate ground water supplies. Transportation related land uses such as airports, highways, rail yards, and truck terminals take up a large portion of the region and have a significant impact on water quality.

a) Non-Point Source Pollution

Motor vehicles are the most widespread and difficult to manage non-point sources of pollution. The emissions from the internal combustion engine, at first absorbed into the atmosphere, are

released into through atmospheric deposition onto land and water surfaces. Fluids, used to lubricate and cool moving parts, leak out during the lifetime of a vehicle and are deposited on land surfaces. Other vehicle components such as brakes and tires wear away through friction, scattering hydrocarbon and metal elements across our region's highways and parking lots. Gasoline and service stations for these vehicles potentially become sources of greater pollution when fluids are accumulated in greater quantities and spills occur. Commercial establishments that rely on heavy automobile access, such as fast food franchises, become "hot spots" of vehicle related pollution. The parking lot, road and highway infrastructure required for automobiles increases the amount of impervious surface in a watershed, and contributes to increased stormwater runoff. The associated maintenance practices of salting and sanding parking lots and roads also contribute to pollution. All of these vehicle related pollutants deposited on impervious surfaces may be deposited into the region's streams, lakes and rivers during storm events.

b) Major Roads Cross Water Supply Recharge Areas

Major roads and highways cross much of the Pioneer Valley's public water supply areas, placing these resources at risk of contamination from the salts, petroleum hydrocarbons, asbestos, solids and metals contained in highway stormwater runoff. Of the region's 298 public water supply wells, 144 have a highway or interstate passing within their interim wellhead protection areas. Where recreation facilities such as campgrounds, parklands, motels and restaurants are grouped, clusters of public wells appear directly along the highway. Sections of special note include Rt. 20 in Monson and Brimfield, Rt. 19 in Brimfield and Wales, and Rt. 202 in South Hadley and Granby. Several miles of major roadways pass through DEP Approved Zone II areas, including Rt. 10 in Southampton and Westfield, Rt. 202 in Westfield, I-91 in Hatfield, Rt. 9 in Amherst and Belchertown and Rt. 57 in Southwick.

c) Transportation Support Facilities Can be a Major Source of Pollutants

Transportation facilities, including bus terminals, and government and private fleet service areas, are a potential contributor of non-point source pollution since they are similar to general service gas stations or vehicle repair service shops. In addition to engine and body maintenance, maintenance shops wash and fuel the vehicles on-site. These activities produce solid and liquid wastes, which are carried off of the paved surfaces by stormwater runoff. Transportation related wastes include: used oils, oil filters, gasoline and diesel fuels, antifreeze, solvents, brake fluid, batteries, sulfuric acid, battery acid sludges, empty contaminated containers and soiled rags. Leaking underground storage tanks can cause groundwater contamination and create a safety hazard. Stormwater can be contaminated by any of these wastes that are not stored properly.

d) Urban Run-off and Combined Sewer Overflows

Combined sewer overflows (essentially stormwater discharges to bodies of water containing raw sewage from sanitary sewer lines) are a serious problem in the lower Pioneer Valley, preventing the stretch of the Connecticut River south of the Holyoke Dam from reaching fishable/swimmable standards. Stormwater runoff from roads, parking lots, and buildings is greater than the capacity of the combined sanitary and stormwater sewer lines. Rather than have the waste water treatment plant overwhelmed and create flooding in basement and streets, combined systems have been designed to discharge this additional volume to the river.

A 1988 study identified 134 CSOs outflow points and provided recommendations for achieving needed reductions, primarily by separating tributary sewer lines, in the seven communities of Agawam, Chicopee, Holyoke, Ludlow, South Hadley, Springfield and West Springfield. Combined sewer and storm systems run beneath local streets and under sections of several state highways, including I-90. Therefore, a cost-effective strategy to separate storm and sewer systems is during road repair and reconstruction work, to reduce the expense of removing and then

repaving roadways to access the storm and sewer infrastructure. There are currently 81 CSO's remaining in the seven communities; work is ongoing to completely eliminate combined storm and sewer systems.

Direct discharges of stormwater can also contaminate water resources. Stormwater conveys pollutants on the land surface, such as oil and grease, fertilizers and pesticides, and road salt and sand into stream, lakes and ponds. Runoff from urban areas contains many different types of pollutants, depending on the land uses and activities that occur within the watershed. Road and parking lot run-off is frequently contaminated with oil and grease, lead, cadmium, and other pollutants. Uncontrolled runoff from industrial sites may contain PCBs, heavy metals, high pH concrete dust, and many other toxic chemicals. Residential areas contribute herbicides, pesticides, fertilizers and animal waste to runoff. All of these contaminants can seriously impair beneficial uses of receiving waters. The Massachusetts Department of Environmental Protection has developed Stormwater Management Policy that identifies land uses and mitigation strategies to manage stormwater and nonpoint source pollution. The policy provides standards and guidelines for controlling run-off and should be consulted for all stormwater mitigation projects.

These stormwater discharges, particularly from impervious surfaces such as roadways and parking lots and denuded roadsides, also contribute to stream erosion and flooding which can affect biodiversity in streams and riparian corridors. Habitats are drastically altered when a stream changes its configuration and deposits its sediment load in response to huge stormwater surges. Run-off also tends to cause an increase in water temperature from heated surface runoff and as vegetation which shades the water is removed. This increase in water temperature may cause alga blooms, which reduces the amount of dissolved oxygen in the water. The lack of dissolved oxygen can kill fish and other aquatic organisms. Increased levels of total suspended solids (TSS) also clog fish gills, cover spawning areas in stream and river-beds and contribute to the infill of all types of water resources.

e) Road Salt and Sanding Practice

Highway maintenance requires numerous operations that can impact water quality. These include salting and sanding roads, inspecting and maintaining stormwater facilities, and other "housekeeping" practices. Proper maintenance of public and private stormwater facilities (catch basins, detention basins, swales, culverts, outfalls, etc.) is necessary to insure they serve their intended function. Without adequate maintenance, sediment and other debris can quickly clog these stormwater management structures, making them essentially useless. Rehabilitation of such facilities is expensive, and in the case of infiltration systems may be impossible. Polluted water and sediments removed during the cleaning operation must be properly disposed. Non-structural management options that can significantly improve water quality are street sweeping and routine maintenance and cleaning of stormwater catch basins.

f) Gravel Roads Require Proper Design, Maintenance and Repair to Prevent Erosion and Sedimentation

Heavy storms produce rapid water velocities which increase the potential for soil erosion especially on and around gravel roads. Pollutants such as oil and grease can also be washed from gravel roads along with exposed soil, and fine sands and silts. These roads, by nature of their topography and design, can, if not properly managed, contribute heavily to this significant water pollution problem. These sediments and pollutants are then carried away into nearby streams and ponds. Sediment loading is a major cause of water quality problems in both lakes and streams.

3. Land Use - Sprawl

I've been driving from one meeting about sprawl to the other for the last fifteen years, and the only thing that's changed is that it now takes longer to get there.

Rob Melnick, Arizona State University

a) Land Use/Transportation Nexus

The relationship between transportation and land use is one that shapes both the visual character and the function of communities and regions. The development and use of land is linked to its accessibility and resources. In general, better access increases the desirability of the land and enhances its development potential. Likewise, the use of land affects the transportation system. Reflecting on the inter-connectedness of the relationship between a region's transportation system and the region's land use reveals the chicken and egg-like nature of this relationship. Does a transportation system create sprawl? Or do existing land use practices, rules and regulations create auto-dependent transportation systems?

Moving from problem-based to solution-oriented thinking one is left with the questions: can land use planning create a transportation system that is not overly dependent on the single automobile? Can a transportation plan facilitate efficient land use?

Clearly land use and transportation planners in the Pioneer Valley and throughout the Commonwealth have accepted the inter-connectedness of land use and transportation planning. The Massachusetts Highway Department has supported this enlightened perspective with transportation funds to implement projects designed to facilitate smart growth and encourage a diverse transportation system in the Pioneer Valley. This regional transportation plan update must be in sync with the region's land use plan, Valley Vision, and, as Valley Vision is up-dated, it must be in sync with this and subsequent versions of the region's RTP. (See Appendix for a copy of Valley Vision)

The inter-connectedness of land use and transportation planning is manifest in concrete ways; i.e. the demand placed on a transportation system is linked to the distribution, density, and types of land uses. Commercial retail centers generate more traffic than a professional office building, while a professional office building draws more daily trips than a low-density residential neighborhood. And it is manifest in the value system planners and other government officials bring to their work. As we face the new millennium, it is time for transportation planners to question the old methods they have used to evaluate existing transportation systems.

Transportation planning and the resulting transportation systems affect how land is used. At the same time, land use affects transportation planning. Transportation planning is mostly concerned with the design, creation, and maintenance of the transportation system, which in the United States means mostly roads. Roads are evaluated based on their ability to serve the existing demand. A traditional means of evaluating a road is to evaluate its 'level of service', i.e. how quickly can cars move on it. Level of service is a proxy for speed. (Ewing, p. 72) To make it possible for people to move faster. Roads are built and widened, resulting in the un-planned (but certainly not un-anticipated) consequence that people can now drive further. As new roads are built, development becomes increasingly dispersed. Dispersed development, commonly referred to as sprawl, is generally agreed to be an inefficient use of land. Thus we see how a transportation system, and the planning that goes into creating such a system, actually promotes inefficient land use by encouraging sprawl.

Just as transportation facilities can encourage and perhaps even create land uses of varying efficiencies, so can land uses create or require different kinds of transportation facilities. Compact

land uses encourage pedestrian, bicycling and transit traffic, thereby stimulating a need for different kinds of transportation facilities: bike paths, sidewalks, transit, and others.

The inter-dependence of the land use-transportation system has implications for the choice of transportation performance measures. Ideally, measures will reflect the efficiency of both land use patterns and transportation networks; they will acknowledge the multimodal nature of the system; and they will treat the links and nodes as part of the system.

Alternative means of evaluating transportation systems, something other than level of service, do a better job of factoring land use into the overall-planning picture. They recognize the effect of the transportation system on land use. In his excellent book, *Transportation and Land Use Innovations: when you can't pave your way out of congestion*, Reid Ewing suggests a number of alternatives to level of service.

One approach, vehicle miles traveled (VMT) is already used in the Pioneer Valley, but not as a broad-based means of evaluating the transportation system. Instead, VMT is used as a way of measuring air quality. Ewing suggests regions take on a goal of striving to reduce vehicle miles traveled (VMT) over time throughout the region. VMT was chosen in the Clean Air Act as the principal travel measure for air quality planning in high ozone and carbon monoxide areas. It makes sense that the Pioneer Valley is using VMT to measure air quality.

"VMT has a simple elegance for growth management as well. If development is compact, VMT will be low. If land uses are mixed, VMT will be low. If the road network provides direct connections, VMT will be low. If transit and ride sharing are well utilized, VMT will be low." (Ewing, p. 75)

Another approach to evaluating transportation systems is to look at vehicle hours of travel (VHT). This measure achieves similar ends as VMT, but also gets at the problem of congestion. The more time people spend in their cars, the more they are polluting the environment. A system-wide goal of reduced VHT would move the region toward a more balanced transportation system which facilitated more efficient land use. Again, the more compact the development, the less time people will spend in their cars.

Ewing suggests the following formula for VHT:

$$\text{VHT/person} = \frac{\text{average trip frequency x average trip length x (1-avg bike/walk share)}}{\text{Average vehicle occupancy x average vehicle operating speed}}$$ (p. 76)

The Pioneer Valley needs to consider modifying the way it evaluates its transportation system. If average vehicle operating speed, or as it is more commonly called, level of service, is maintained as the primary performance measure to evaluate the region's roadways, then the region should institute a variable standard of level of service that permits more congestion in central areas. If not, level of service will continue to promote sprawl by driving development to outlying areas where excess capacity exists. (Ewing, p. 79)

An example of a transportation system performance measure that integrates land use considerations exists in Orlando, Florida. The city uses an area-wide level of service measure to judge roadway performance in the downtown area. Specifically the percentage of total lane miles operating at or above a certain service standard is monitored and judged against a goal of 85 percent at or above. While not as useful as average travel speed, a 'percent of lane miles' measure at least allows some localized congestion as long as the network as a whole is performing adequately. (Ewing, p. 81)

b) Goals:

- The Pioneer Valley should commit to working to a target of having VMT grow no faster than population.

- The Pioneer Valley should factor land use data into its regional transportation-planning model.

c) Land Use In The Pioneer Valley

Low-density urban sprawl has become the Pioneer Valley's dominant form of growth. Within the lifetime of many residents, 34,000 acres of land in the Pioneer Valley region has been developed for urban uses, a 71% increase (from 1952 to 1985). The development of land for urban uses is accelerating in the Pioneer Valley. In the fourteen years between 1971 and 1985, a total of 15,542 acres of open land was converted to urban use in the region, a rate of 1,110 acres per year. PVPC estimates that in the nine years between 1986 and 1995, a total of 13,430 acres of land was developed, a rate of 1,492 acres per year.

Table 8-6 - Top Pioneer Valley Communities with Increases in Urbanized land (in acres)

Rank	Community	1971-85	1986-95	1971-95
1	Belchertown	1,262	998	2,260
2	Westfield	1,415	669	2,084
3	Agawam	1,081	460	1,541
4	Monson	505	882	1,387
5	Southwick	567	736	1,303
6	Westhampton	235	930	1,165
7	Palmer	434	729	1,163
8	West Springfield	600	414	1,014
9	Chicopee	508	448	956
10	Northampton	616	317	933
10	Springfield	586	347	933
	totals	7,809	6,930	14,739

The highest rates of land conversion are occurring in suburban and exurban communities. While the region's total population grew at only a 3.6% rate from 1980 to1990, exurban communities such as Belchertown, Plainfield, Worthington, Wales, Holland, Brimfield, Pelham, and Tolland experienced the region's highest growth rates at over 20% each.

As discussed, there is clearly a connection between the sprawling land use in the Valley and an increase in traffic. Which came first is not our concern here—but rather we seek to document the problem (see figure 7-2).

d) Traffic Congestion

No one likes to sit in traffic. Both land use and transportation planners appeal to the public to support planning initiatives designed to reduce traffic congestion. It would appear that commercial sprawl, particularly in the form of commercial developments, is choking our region's highways, such as Route 9 between Amherst and Northampton, Route 20 in Westfield and Springfield, Route 5 between West Springfield and Holyoke, and Route 10 between Southwick and Easthampton. Commercial development consumed more than 1,100 acres in the Pioneer Valley between 1971 and 1985.

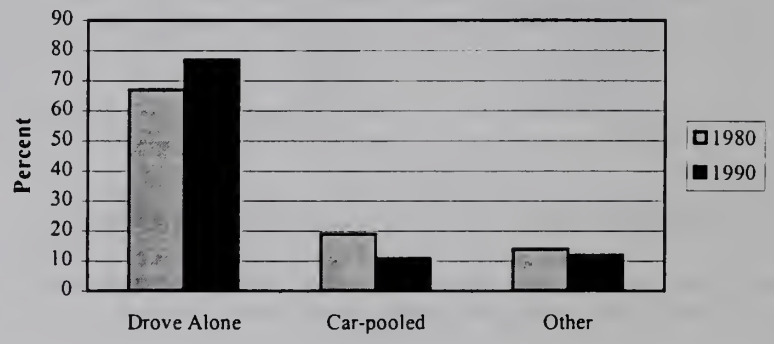
Route 9 between Amherst and Northampton, through the town of Hadley, is a perfect example of the problem of sprawl and transportation. In the late 1980s 32 new businesses were completed or proposed. Today the region faces a major construction project along Route 9 which is an attempt to retro-fit the road to handle the huge increase in traffic that has been caused by sprawling development.

Just as commercial development along roadways is causing inefficient use of land, industrial growth is harming the long-term potential of land use in the region. The industrial growth of the region has occurred primarily on 'greenfields' sites, undeveloped land in suburban locations. Industrial development consumed more than 1,500 acres from 1971 to 1985. A more efficient use of land for industrial development is converting brownfields, abandoned industrial sites, usually located in urban centers for contemporary industrial and perhaps commercial and even residential uses.

The region is becoming increasingly auto-dependent because of the sprawling land use pattern. Or, perhaps it is the region's over-dependence on a single mode of transportation, the automobile, that is encouraging sprawl?

- Workers are commuting longer distances to work. Total VMT in the Springfield-Chicopee-Holyoke area increased 27% from 1980 to 1990.
- Commuting times are also increasing. As of 1990, 61% of the region's workers traveled more than fifteen minutes to work, and 21% traveled more than thirty minutes.
- There is an increase in single occupancy vehicle trips. From 1980-90, carpooling declined from 19% to 11% of all work trips.

Figure 8-2 - Preferred Mode of Transportation of Residents Traveling to Work



e) Increased Auto Use Contributes to Declining Air Quality

Land use has had a significant impact on air quality in the Pioneer Valley over the past few decades. A cornerstone of the Regional Land Use plan, Valley Vision, was a series of three alternative build-out scenarios designed to assess the impacts of sprawl versus compact forms of growth and development in the Pioneer Valley. The three alternative land use patterns examined were: 1) dispersed development scenario—what is happening now, 2) compact development scenario, and 3) satellite development scenario. The transportation impacts of the three alternatives are summarized as follows:

- dispersed development: single occupancy automobiles remain dominant
- compact development: greater reliance on mass transit and non-motorized transportation, and
- satellite growth center development: transit and bicycle/pedestrian networks linking satellites and urban/village centers.

The table below summarizes the projected impact, by the year 2020, of the dispersed versus the satellite growth scenarios on the VMT and air quality emissions in the Pioneer Valley. It is impossible to disconnect transportation planning from land use planning. The most conservative estimates indicate that the satellite scenario can reduce VMT by at least 4 percent in 2020, over the current pattern of dispersed growth. The impact on air quality from vehicle-relayed emissions is similar. The satellite scenario results in a four to five percent reduction in emissions of air pollutants. Less conservative estimates show a reduction of as much as fifteen percent in vehicle miles traveled and a similar impact on vehicle-related emissions.

Table 8-7 – Dispersed Vs. Satellite Growth Scenarios on VMT

	Year 2020 Impacts Dispersed Scenario	Year 2020 Impacts Compact Scenario	Percent Reduction with Compact Growth Scenario
VMT	12,668,130	12,116,915	-4.4%
Hydrocarbon Emissions (Grams per summer day)	6,608,778	6,357,130	-3.8%
Carbon Monoxide Emissions (Grams per summer day)	52,156,338	49,323,799	-5.4%
Nitrogen Oxide Emissions (Grams per summer day)	14,004,242	13,497,391	-3.6%

f) The Big Picture

What is happening in the Pioneer Valley, transportation facilities affect land use and vice versa, is happening all over the country.

- Motor vehicle use in America doubled from one to two trillion miles per year between 1970 and 1990;
- Our typical suburban household owns 2.3 cars, takes 12 automobile trips per day and drives 31,300 miles per year. American households now spend more on transportation than on food
- The evidence is substantial and growing to the effect that people in spread-out locations drive more, and people in compact locations drive less.
- Research also suggests that as neighborhoods become more compact, more trips are made by walking, bicycle, and public transit (Once there were greenfields-p. 31, 32, 36, 37)

Longstanding research on the relationship between transit and land use suggests the following relationship between land use and transportation as shown in Table 8-8.

Table 8-8 – Land Use/Transportation Relationships

Density (per residential acre)	Transit service supported
4-5 households	Hourly bus service
7-8 households	Half-hour interval service
15+ households	Service every 10 minutes

Most reviewers agree that the body of research on density and travel, notwithstanding some differences in methodologies and variations in the details among the findings, is generally consistent in its overall conclusions: as population and employment density decline, travel distances lengthen, vehicle trips and usage increase, and transit and walking decline. (Once there were greenfields, p. 39)

Many new suburban developments are being built at densities that are intrinsically dysfunctional from a transportation standpoint. (Once There Were Greenfields, p. 40)

Resources Used:
Once There Were Greenfields
Transportation and Land Use Innovations: when you can't pave your way out of congestion
The Pedestrian, Transit, and Bicycling Workbook
Valley Vision

G. TITLE VI REQUIREMENTS IN METROPOLITAN PLANNING

Title VI of the 1964 Civil Rights Act (42 U.S.C. 2000d-1) states that "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." The Environmental Justice Orders further amplify Title VI by providing the "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Title VI and Environmental Justice concerns are typically raised during project development, it is important to recognize that the law applies directly to the planning process. As a result, the following measures should be undertaken in the Pioneer Valley region to ensure conformity to this law.

- Develop a demographic profile of the metropolitan planning area that includes identification of socio-economic groups, including low-income and minority populations as covered by the Executive Order on Environmental Justice and Title VI provisions.

- Develop a process to assess the distribution of impacts on different socio-economic groups for the investments identified in the Pioneer valley Regional Transportation Plan and Pioneer Valley Transportation Improvement Program. One possible method could utilize income information available from U.S. Census data. Information could be obtained for each Traffic Analysis Zone in the regional transportation model and information on past construction activity overlaid to determine previous areas of investment.

- Ensure that the needs of low-income and minority populations are identified in the regional planning process for the Pioneer Valley. Amend the Public Participation Plan for the region to include strategies for engaging minority and low-income populations in transportation decision making.

Possible changes could include increased use of the media to alert interested parties of upcoming public meeting for the TIP and RTP.

- Develop a standard format to document and respond to issues raised by citizens and advocacy groups with regard to transportation investment patterns in the PVPC region.

- Develop a methodology to determine if proposed transportation investments and strategies are appropriate for low-income and minority areas. This process should include the social, economic and environmental effects of the proposed alternative. In the event a proposed improvement is found to have negative impacts, mitigation should be developed to offset and adverse effects.

H. EXECUTIVE ORDER 418

In January of 2000, Governor Argeo Paul Cellucci issued Executive Order 418 for the State of Massachusetts. This initiative was developed to assist communities in addressing the housing needs of the state. Under this program, communities are eligible for up to $30,000 in technical assistance and planning services to assist in the development of Community Development Plans. The plans must focus on the development of housing for a broad range of incomes and include measures to promote economic development, improvements to transportation and infrastructure, and the preservation of open space in the community.

The Pioneer Valley Planning Commission began working with the Executive Office of Environmental Affairs in February of 1999 to complete a build out map and analysis for every community in the region. This work consisted of a series of GIS maps to illustrate the maximum possible development scenario for each community under its existing zoning regulations. To date, the PVPC has completed the build out process for 14 of our 43 communities. Completion of the community build out process is anticipated in June of 2001.

As the regional planning agency for the Pioneer Valley, PVPC is responsible for the administration of Executive Order 418 funds for each community. In addition, the PVPC will:

- Develop agreements with each community and identify specific tasks and responsibilities.

- Manage and distribute the planning funds allocated to the community for their Community Development Plan.

- Assist each community in the development of the Scope of Services for their Community Development Plan.

- Contract with a private consultant chosen by the community from the state approved list, or contract directly with the community to produce the Community Development Plan.

- Work with MassHighway and the local communities to develop regional or subregional transportation components of their Community Development Plan.

I. TRANSPORTATION IMPROVEMENT PROGRAM

The Transportation Improvement Program (TIP) is the programming connection between regional needs and expenditures. The TIP is a prioritized, financially constrained, multi-year program for the implementation of transportation improvement projects in this region. The TIP is important for a number of reasons. First, a transportation project which is to receive funding assistance must be listed in the TIP. Second, the TIP is a federal requirement. This six-year program must be adopted and

amended by the eight-members of the Pioneer Valley region's Metropolitan Planning Organization (MPO).

1. Project Activity

While the TIP projects how future transportation and transit funds are expected to be spent, it is also important to keep track of what was actually constructed. In FFY 1999, the amended TIP included less than $3 million in federally funded road and bridge projects. By FFY 2000, we experienced a more positive investment in our regional infrastructure. Table 8-9 outlines $20.3 million in projects that were actually advertised and awarded in our region during FFY 2000, in accordance with the FFY2000 TIP.

Table 8-9 - Federal Fiscal Year 2000 Projects Advertised and Awarded

Community	Project Name	Project Description		Total Cost
Amherst	ITS Earmark for UMass	UMass Traffic Operation Cntr.	$	1,500,000
Brimfield	Monson Rd.	Replace: BR# B-24-00 over Foskett Mill and road work	$	898,768
Easthampton	Union St./Cottage St.	Reconstruction: intersection and signalize	$	250,000
Hadley/N. Hamp.	Calvin Coolidge Bridge	Rehabilitate: BR#H-01-012 over Conn. River	$	12,432,575
Monson	Wales Rd.	Rehabilitate: Moulton Hill Rd. to Wales TL	$	364,624
Nhmpton/Ehmpton	Manhan/Norwottuck Rail Trail	Connections in Wlmsburg, Ehmpton, Nhmpton, Amherst, Holyoke	$	3,750,000
Northampton	Chesterfield Rd. Bridge	Replace: BR# N-19-033 & approaches	$	534,926
Springfield	Dwight, Chestnut, Columbus	Signal Upgrades	$	634,262
			Totals:	$ 20,365,155

The financial future of the region, in terms of available funding for transportation infrastructure shows regional needs far outpacing available funds. Table 8-10 depicts over $300 million in road and bridge projects currently in some phase of design. The federal aid targets which MHD provided us with total $101,910 million over the next five years. Given this projected rate of spending, it will take more than fifteen years to address our current needs, i.e. projects which are currently approved by the state, and are in the process of being designed.

Table 8-10 – Summary of Transportation Projects in the PVPC TIP Database

Project Type	Number of Projects	Total Cost
Highway Projects	120	$199,713,382
Bridge Projects	30	$83,260,250
Interstate Maintenance	2	$13,500,000
High Priority Projects	6	$34,856,000
Bike Trail/Enhancement Projects	7	$7,153,500
Transit	109	$197,849,940
TDM/TMA	4	$735,765
Congestion Mitigation and Air Quality	13	$9,100,000
Totals:	**291**	**$546,168,837**

J. REGIONALLY SIGNIFICANT SHORT RANGE PROJECTS

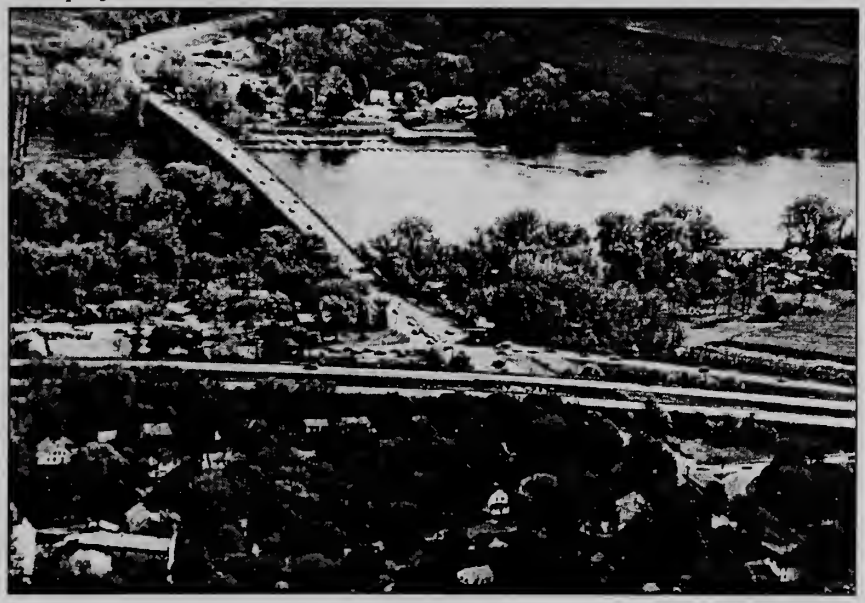
1. Widening, Reconstruction and Signal Coordination of Route 9 and the Expansion of the Calvin Coolidge Bridge in Hadley

Severe congestion problems exist along Route 9 from Northampton to Hadley including the Calvin Coolidge Bridge. The bridge is currently listed as a deficient bridge and spans the Connecticut River between Hadley and Northampton. This heavily traveled bridge provides three lanes of travel, one westbound and two eastbound. Westbound traffic often queues over the entire Bridge and along Route 9 to West Street in Hadley. Eastbound vehicles flow well over the bridge, but must merge down to one lane directly after the bridge. A traffic signal at the intersection Route 9 with Bay Road contributes to delays in this direction. Route 9 is a major commercial corridor in Hadley and Amherst and also serves as the main route for all traffic traveling from I-91 to the University of Massachusetts.

The Calvin Coolidge Bridge has been scheduled for reconstruction since FY 1998 and includes the addition of one lane to the bridge to provide two travel lanes each direction. Route 9 will be widened from two to four lanes from the Bridge to West Street, Hadley. Intelligent transportation System technology will also be introduced to this area as part of this project. Cameras will be installed for both the Route 9 bridge and Route 116 bridge in Sunderland. A series of variable message signs will be deployed along the I-91 and Route 9 corridor to provide real time information to motorists during the construction project. The Massachusetts Highway Department District 2 office and the Massachusetts State Police will jointly maintain a regional traffic information center to provide up to date information and employ traffic signal pre-emption to aid emergency vehicles attempting to cross the bridge. A separate project will coordinate traffic signals along Route 9 from Mill Valley Road in Hadley to University Drive in Amherst.

Traffic flow is expected to improve in this area in both directions by increasing the number of lanes along the bridge and the section of Route 9 directly east of the Bridge. Signal coordination will further ease congestion along the entire corridor and should provide easier access for businesses located along Route 9. Travel times should decrease as a result of due to less congestion.

This project was modeled in the 2003 future network. The additional lanes reduced the congested travel time from the Calvin Coolidge Bridge to West Street in Hadley over 100%. The projected traffic flow increased by 20%, however, due to the reduction in travel time the congested travel speed increased from 13mph to 31mph. The model showed that this is a beneficial project for the region by increasing vehicle access while reducing congestion and travel time.



2. Corridor Signal Coordination Projects in Springfield, Chicopee and Westfield

Four different traffic signal coordination projects were included in the 2003 transportation model. By coordinating signals along heavily traveled corridors, traffic flow can be regulated thereby reducing congestion along the corridor. All four locations experience severe congestion during the peak travel hours. Traffic signal coordination for Boston Road is currently underway and expected to be completed in 2000. Signal coordination on Berkshire Avenue in Springfield from State Street to Cottage Street, Route 20 in Westfield from Union Street to Mainline Drive, and Memorial Drive in Chicopee from Massachusetts Turnpike Exit 5 to Granby Road are currently on the FY2000 TIP.

The model projected a reduction in congested travel time along these corridors, which was analyzed with the congested travel time of the base year 1997 model. The following table shows the percentage decrease for each of the locations.

Table 8-11 - Signal Coordination Model Results

Corridor Location	Results
Berkshire Avenue, Springfield	15-17% reduction in travel time
Boston Road, Springfield	11-12% reduction in travel time
Route 20, Westfield	18-20% reduction in travel time
Memorial Drive, Chicopee	3% reduction in travel time

3. Route I-91 Ramp Reversal

Several major changes to Interstate 91 are proposed as part of the expansion to the Basketball Hall of Fame, construction of a new tourist information center and a retail pedestrian mall in downtown Springfield. These include construction of a new slip ramp from Interstate 291 westbound to East Columbus Avenue (implemented in the 2010 model) and the reversal of many existing Interstate 91 on and off ramps. These alternative ramps are expected to ease congestion along East and West Columbus due to economic expansion in downtown Springfield. The I-91 ramp reversal project was included in the 2003 regional transportation model as shown in Table 8-12.

Table 8-12 - I-91 Ramp Reversals in Springfield

Existing Ramp	Proposed Replacement Ramp
1. Northbound off ramp to East Columbus Avenue between State Street and Union Street	Northbound on ramp from East Columbus Avenue between State Street and Union Street
2. Southbound on ramp from West Columbus Avenue between State Street and Union Street	Southbound off ramp to West Columbus Avenue between State Street and Union Street
3. Northbound on ramp from East Columbus Avenue between Broad Street and Union Street	Northbound off ramp to East Columbus Avenue between Broad Street and Union Street
4. Southbound off ramp to West Columbus Avenue between Broad Street and Union Street	Southbound on ramp from West Columbus Avenue between Broad Street and Union Street

Model results for this project show an increase in traffic flow along East and West Columbus Avenues. Projected traffic along East Columbus Avenue increased from approximately 7600 to 15700 vehicles per day and along West Columbus Avenue the projected volumes increased from 5400 to 12000. Corresponding to the increase along East and West Columbus Avenues a 15% reduction in traffic volume occurred along I-91 between Broad and Union Streets. The increased traffic flow along these routes would be beneficial to any additional business development in these locations. The proposed ramp system would eliminate the short distance between on and off ramps traveling both north and south on I-91. This would aid in alleviating confusion of motorists along East and West Columbus Avenues thus increasing travel speed by 5%. The increase in travel speed is projected to decrease travel time by approximately 4% along these corridors as well.

4. Route 5 Signal Coordination

Recent expansion and renovations to the businesses located along the heavily traveled Route 5 corridor has required traffic mitigation measures. Previous signal work has been completed along Route 5 at the I-91Exit 13B interchange in an effort to channel vehicles from the highway to the main business location known as the Riverdale Shops. This location continues to undergo retail and business growth and has been identified by the Pioneer Valley CMS as a congested area. To aid in relieving congestion along this corridor, an additional traffic signal will be placed along Route 5 between Elm Street and Monterey Drive. In addition to this signal, which will allow vehicles to make a left turn from Route 5 northbound into the Showcase Cinemas site, traffic signals will be coordinated along Route 5 from Elm Street to Ashley Avenue.

The model shows projected travel speeds traveling both north and south along Route 5 will increase by approximately 6-8%. Additionally the travel time along this corridor will be reduced by 6-7%. The new signal that will now allow south bound traffic a left turn between Elm Street and Monterey Drive reduces the traffic flow south of this location by 3%.

5. Union Station Intermodal Redevelopment Project

Redevelopment of Union Station in downtown Springfield is an important regional project to enhance the mobility of residents in the Pioneer Valley region. The vacant building is currently owned by the Springfield Redevelopment Authority, who in cooperation with the PVTA have begun efforts to fund a project to rehabilitate and redevelop Union Station into an intermodal transit center. Funding for a full-scale feasibility study of the reuse of Union Station was provided in the 1998 TIP using FTA Section 5309 money. The project has also received approval from NEPA and MEPA.

Rehabilitation of the facility is funded with a combination of federal, state, and private funds. A total of $14.5 million is earmarked for the project in TEA-21, and $10 million in State funds has been appropriated for the project as part of the 1997 Transportation Bond Bill.

The Union Station project provides PVTA transit, intercity bus carrier, Amtrak and local taxi services at one location in downtown Springfield. Office, retail and restaurant spaces are also proposed to be included as part of the redevelopment of the site. The redevelopment of Union Station will ensure the region of a state of the art intermodal transportation facility and revitalize a historic landmark in the City of Springfield. Most importantly, the project will improve air quality and reduce VMT by greatly improving the connectivity between several different modes of transportation.

6. Intelligent Transportation System Study – University of Massachusetts

Funding has been earmarked for the University of Massachusetts, Amherst (UMass) campus to advance ITS technology in the Pioneer Valley region. Recently, UMass installed a traveler information system for the Route 9 corridor in Hadley and Northampton. This project consisted of cameras to read license plate information and provide data on the average travel time and speed from

North Maple Street in Hadley to Damon Road in Northampton. The UMass ITS project could expand upon this as well as enhance the advanced traffic management system developed for the Calvin Coolidge Bridge Rehabilitation project. The possibility of UMass serving as the information service provider for the regional ITS traffic control center maintained by MassHighway District 2 and the Massachusetts State Police may also be addressed.

7. Intelligent Transportation System Study for the Southern I-91 Corridor

Several major transportation projects as proposed for the southern I-91 corridor over the next few years. These include the redevelopment of Union Station, ramp reversals along I-91, extension of Route 57, and the reconstruction of Route 5 in West Springfield. In addition, longer range projects such as the proposed improvements to the South End Bridge, elimination of the Route 5/57 rotary, and improvements to I-91 NB in the vicinity of Exit 1 will all have construction impacts on I-91 and surrounding roadways.

An ITS study should be conducted for this area to expand upon the recommendations of the ITS Strategic Deployment Plan for the Pioneer Valley. The study should identify the most efficient use of the equipment and recommendations identified in the Strategic Deployment Plan and develop an updated prioritization list and implementation schedule. Information should also be provided on additional equipment required to link the southern I-91 ITS system to the regional traffic operation center at MassHighway District 2.

8. Deady Memorial Bridge Traffic Study

The Deady Memorial Bridge links Route 33 to Main and Broadway Streets in Chicopee. This corridor is identified as a congested location as part of the Pioneer Valley CMS. A short-range study for this area is listed in PVPC's current UPWP. Based on the outcome of the short-range study, a long-range corridor study may be required for this area to identify alternatives to alleviate congestion in this area.

9. Alternative Fuels

The PVTA recently received funding to purchase two electric buses for use in their existing fleet. In addition, the City of Springfield is currently in the process of applying for status as a "Clean City." As alternative fuel technology continues to gain in popularity and become more affordable, demand for these vehicles is likely to increase in the region. A feasibility study should be conducted for the region to the benefits of providing alternative fueling stations in the Pioneer Valley. This study would identify the most appropriate type of fueling station (i.e.: electric, compressed natural gas, etc.) and most efficient location of proposed stations. Alternative fuel stations should then be constructed in the region based on the recommendations of the feasibility study.

10. Agawam Portion of the Connecticut Riverwalk

This project will construct a 2.1 mile bicycle path parallel to the Connecticut River and River Road in Agawam. When completed, the Riverwalk will provide local residents with an alternative to driving to downtown Springfield central business district and the attractions of Riverfront Park and the basketball Hall of Fame.

11. Parking Expansion and Enhancements for the Norwottuck Rail Trail

The PVPC completed a parking study for the Norwottuck Rail Trail in the fall of 2000. This study focused on the existing parking supply problems experienced at the Damon Road parking lot for the Norwottuck Rail Trail. Additional parking capacity is required in this area and improvements and amenities are needed to attract more trail users to the other four parking locations along the trail.

12. Transit Improvement Projects

a) Economic Development Guide

PVTA has commissioned the development of an Economic and Business Development Guide that develops strategies for PVTA to pursue during the different stages of land and business development. The project includes means of outreach to both local government and the business community to identify ways of consulting with PVTA during the early development stages of proposed projects.

b) Community Routes

In the past few years PVTA has been repeatedly asked to provide transit service for lower density areas with no transit service and paratransit service for elderly and disabled passengers. To meet this need PVTA has developed a number of community routes that merge the service concepts of traditional fixed route and paratransit services. The most recent of the new services uses an innovative point deviation service designed to provide service nearly at the paratransit level to a community on a fixed schedule. In addition to providing a high level of service to passengers this hybrid service has the potential for reducing paratransit trips and costs by attracting paratransit riders.

PVTA expects to expand the number of Community Routes as needed to serve member communities. In addition, PVTA will be reviewing some of the lower performing fixed routes for possible conversion to route deviated hybrids to lower the costs of providing both fixed route service and complementary paratransit service in the same area.

c) Park and Ride Development

Express service originating from Park and Ride lots can provide the high levels of service needed to attract passengers out of their cars and on to transit. PVTA is in process of reviewing regional opportunities of new Park and Ride Facilities. Particular attention is being placed on providing transit alternatives to Route 9 congestion during the reconstruction of the Calvin Coolidge Bridge.

d) ITS Integrator

Over the past five years, the PVTA has made a number of ITS investments. In order to integrate these technologies with day to day operations, PVTA will be investing in an ITS integrator with an Automatic Vehicle Location (AVL) system to provide real time operational control over the bus system. The AVL system will provide real time location information for each bus in the system to dispatchers and operations personal as well as to PVTA's customer information center. The system is also expected to connect with existing ITS technologies providing location specific addressing to the passenger counting fare box system and the on board security cameras.

e) Pioneer Valley Community Transit Enhancement Project

The Pioneer Valley Transit Authority (PVTA) and Pioneer Valley Planning Commission (PVPC) are working to improve air quality and community livability by implementing the Community Transit Enhancement Project in 2001. The focus of this project will be to respond directly to community initiated projects to add and improve transit stop amenities and strengthen connections between transit stops and the surrounding neighborhoods. By making transit and transit stops a vibrant focal point of each community, more people will be encouraged to take the bus. Three community initiated projects will be selected to make physical improvements to transit stops including construction of shelters and benches, improvement of pedestrian, bicycle, and parking amenities at transit stops, and assistance to communities in adopting transit-friendly changes to

local zoning ordinances. The goals of this project are to both strengthen communities and increase transit ridership. The project will give communities the tools to enhance the appearance of neighborhoods and improve the experience of riding the bus while preserving and revitalizing the traditional urban or town center form. In addition to this project PVTA will be using its own transit enhancement funds as well as other funds to make improvements to additional bus stops and waiting areas.

f) College Pass Program

For many years PVTA has made individual arrangements with the different colleges in the region to provide transit service to their students. These services include reduced fare and free use of some or all of the PVTA bus system. PVTA seeks to work with the Educational Institutions to enhance the services provided to students as well developing uniform use policies.

g) Movement of operations to Union Station

With the opening of Union Station in 2003, a majority of the Springfield based routes will be effected. Most of these will originate, terminate or pass through the new Union Station. This will represent the first significant change of the PVTA system since the route restructuring in 1994-1996. Movement of operations to Union Station will maintain the efficiency of the regional transit system.

h) Downtown Circulator

PVTA is interested in providing a downtown circulator service to serve the new development projects in downtown Springfield. The circulator will connect the new Basketball Hall of Fame, Union Station, and downtown hotels with parking and existing land uses such as Tower Square.

CHAPTER 9

REGIONAL TRAVEL DEMAND MODEL

A. INTRODUCTION

Travel demand forecasting is a major step in the transportation planning process. By simulating the current roadway conditions and the travel demand on those roadways, deficiencies in the system are identified. This is an important tool in planning future network enhancements and analyzing currently proposed projects.

Travel demand models are developed to simulate actual travel patterns and existing demand conditions. Networks are constructed using current roadway inventory files containing data for each roadway within the network. Travel demand is generated using socioeconomic data such as household size, automobile availability and employment data. Once the existing conditions are evaluated and adjusted to satisfactorily replicate actual travel patterns and vehicle roadway volumes, the model inputs are then altered to project future year conditions.

There are four basic steps in the traditional travel demand forecasting process: trip generation, trip distribution, modal choice, and trip assignment. There is also a preliminary step of network and zone development and a subsequent step of forecasting future conditions. The Pioneer Valley Planning Commission (PVPC) uses TransCAD software to perform the traditional 4-step process for forecasting near and future conditions.

1. Network and Zone Development

a) Highway Network

The preliminary step in the development of a travel demand model is identifying the network and dividing the area into workable units. The highway network is composed of nodes and lines. Nodes represent intersections or centroids. Centroids are used to identify the center of activity within a zone and connect the zone to the highway network. Lines represent roadway segments or centroid connectors. Centroid connectors represent the path from a centroid to the highway network and typically represent the local roads and private driveways within the centroid. General information required for network developments include system length, demand, service conditions and connections to zones.

b) Traffic Analysis Zones

Zones are geographic aggregations of individual households and business establishments in the region. Zones are generally referred to as traffic analysis zones or TAZs. Centroids represent the activity center of a TAZ, which can best represent the average trip time in and out of the TAZ. Centroid connectors represent local streets that carry traffic out of or into the TAZ. Centroid connectors generally connect to adjacent collector or arterial roads.

2. Trip Generation

Trip generation is the first step in the modeling process. It identifies the number of trips that are made to and from a designated area (traffic analysis zones). Trip generation analysis estimates the number

of trips that are produced by each zone and the number of trips attracted to each zone for each of the three trip purposes:

- Home-Based Work (HBW) - trips from home to work;
- Home-Based Non-Work (HBNW) - trips from home to other destinations other than work; and
- Non-Home Based (NHB) - trips from a place other than home.

Households generally produce trips, while employment and other activity centers generally attract trips. Estimates of household based trips are effected by socioeconomic factors, such as auto ownership, and household size. Employment based trips depend on employment type, and size.

3. Trip Distribution

Trip distribution determines the destination of the trips produced in each zone and how they are divided among all the other zones in the area. A relationship is developed between the number of trips produced by and attracted to zones and the accessibility of zones to other zones in terms of time and distance.

4. Mode Usage

This step in the development of the travel model estimates the distribution of previous trips to various alternative mode choices. Mode choices may include personal vehicle, transit, walking, bicycling, etc. Several factors affect a traveler's decision regarding the travel modes available. These include the characteristics of the person making the trip, the characteristics of the trip and the characteristics of the transportation system.

5. Trip Assignment

Trip assignment is used to estimate the flow of traffic on a network. The trip assignment model takes as input a matrix of flows that indicate the volume of traffic between origin and destination pairs. The flows for each origin and destination pair are loaded on the network based upon the travel time or impedance of the alternative paths that could carry this traffic.

6. Forecasts

The preparation of a future year socioeconomic database is the last step in the travel demand forecast process. Forecasts of population and socioeconomic data as well as the attributes affecting travel are used to determine the number of trips that will be made in the future. The estimates that forecasts provide are direct inputs in the travel demand forecasting model. Once travel demand is known and deficiencies identified, alternative transportation systems may be developed.

B. 1997 BASE YEAR MODEL

The regional travel demand model is made up of several major components: transportation network, transportation analysis zones, and socioeconomic data. Each of these components adds a critical contribution to the development of a working simulation model.

1. Network

The transportation system in the region is represented in the regional model by roadway network. The highway network was developed based on the federal functional classification of roadways. All roadways in the region classified as interstate, principal arterial and collector are included in the highway network. Local roads carrying minimal through traffic are represented as centroid connectors to areas of traffic activity.

The characteristics of the roadway represented by each line are coded as attributes of the line. Speed and capacity attributes are based on the functional classification and determined from state roadway inventory files of the region. Adjustments were made to these attributes based on field observations, examination of aerial photographs, and review of regional and local traffic studies. Also, adjustments to these inputs were made to better replicate the overall simulation of regional travel activity.

2. Traffic Analysis Zones

Transportation Analysis Zones are the division of the region into analysis units that allow the linkage of data to physical location within the roadway network. The attributes of a TAZ include the regions socioeconomic data, which generate and attract trips. TAZ size and location is based on the 1990 census because it is the most comprehensive, current and readily available source of socioeconomic and demographic information. The Pioneer Valley area is divided by the census into areas called block groups continuing the socioeconomic and demographic information. The region is represented by 532 TAZs and external stations are represented by 62 TAZs in the model. The map of the Pioneer Valley Region's network is represented in Figure 9-1.

3. Socioeconomic Data

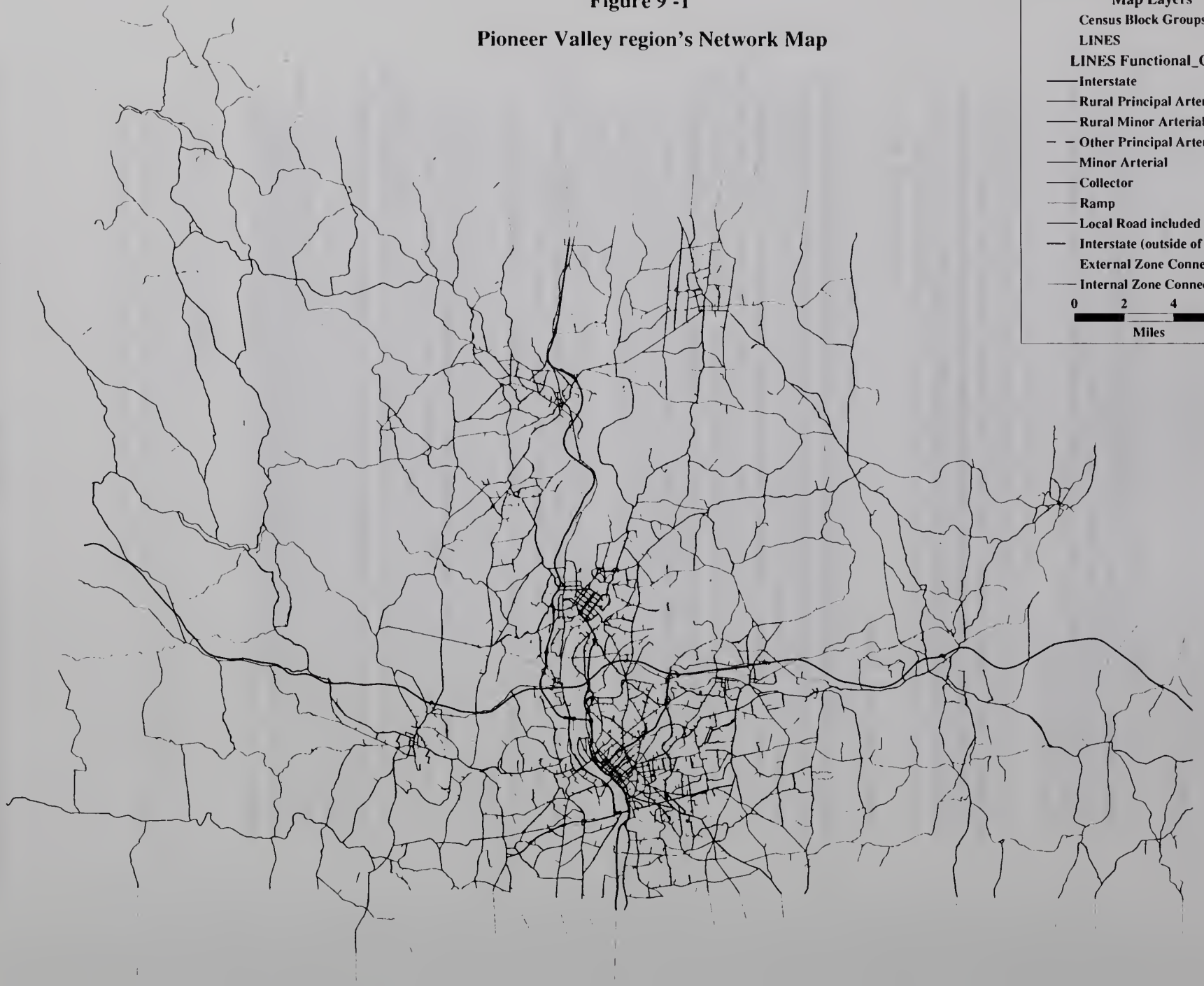
Socioeconomic data for the 1997 base year model includes the number of housing units by block group, the average number of autos per household by block group; the number of retail and non-retail employment by block group; HBW and HBNW trip productions per housing unit; NHB trip productions per retail employee, non-retail employee and household; vehicle occupancy rates; and mode split.

The 1997 population was based on data developed by the Massachusetts Institute for Social and Economic Research (MISER). MISER's population estimates and projections are for Minor Civil Division (MCDs), i.e. cities and towns. The MCD populations were allocated to the Block Groups (BGs) based on each BG's 1990 share of its MCD's population. New residential development was not included because of the limited information to locate the new development when allocating population estimates to BGs.

The population statistics used in the model for each block group includes total population, total number of households, average household size, and average auto availability. This type of information is translated into household cross-classification matrices based on household size and auto availability.

Figure 9 -1

Pioneer Valley region's Network Map



In addition, zonal employment data are also needed as input in identifying the distribution of employment to the TAZs. The zonal employment data categories were defined as:

- Retail
- Service
- Education
- Health
- Entertainment
- Manufacturing
- Other

The 1997 zonal employment data was developed by allocating 1997 total Minor Civil Divisions (MCD) employment (as reported by the Massachusetts Division of Employment and Training under the ES-202 program) based on the ratio of a Block Group's 1990 employment to total 1990 MCD employment reported in the Census Transportation Planning Package (CTPP).

C. FUTURE FORECASTS

1. Analysis Years

The preparation of a future year socioeconomic database is the last step in the travel demand forecast process. Forecasts of population and socioeconomic data as well as the attributes affecting travel are used to determine the number of trips that will be made in the future. The estimates that forecasts provide are direct inputs in the travel demand forecasting model. Once travel demand is known and deficiencies identified, alternative transportation systems may be developed. The following is an overview of the methodology to forecast future conditions.

a) Growth Projections

Socioeconomic data was forecast for the years of 2003, 2010, 2020 and 2025. This data includes the number of housing units by block group; the average number of autos per household by block group; the number of retail and non-retail employees by block group; HBW and HBNW trip productions per housing unit; NHB trip productions per retail employee and non-retail employee; and, household and vehicle occupancy rates.

(i) Population

The forecast of population in the year of 2003, 2010, 2020 and 2025 was based on data developed by the Massachusetts Institute for Social and Economic Research (MISER). MISER's population estimates and projections are for Minor Civil Division (MCDs), i.e. cities and towns. The MCD populations were allocated to the Block Groups (BGs) based on each BG's 1990 share of its MCD's population. New residential development was not included because of the limited information to locate the new development when allocating population estimates to BGs.

The 2003 projection was interpolated from MISER's 2000 and 2005 projection. Projections to 2020 and 2025 were calculated using a cohort birth-survival-migration method to extend MISER's projected 2010 population. This method is similar to MISER's, but the data was used over a longer period of years (1970-1990) to derive the survival and migration rates.

(ii) Households and Automobiles

To estimate and project the number of households by size, it is assumed that the same proportion of the population lives in a household of that size as did in 1990. Thus, the number of households by size was calculated separately for each MCD from the estimated and projected population.

To project future years, the 1997 average number of vehicles per household was used to multiply with the projected number of households.

(iii) Employment

PVPC's Regional Data Center provided the employment forecast for the Pioneer Valley Region. Projected employment was developed using Regional Economic Models Inc. (REMI's) Policy Insight economic modeling program. This model projects employment down to the county level. Thus, growth rates in each of TransCAD's sectors were determined for each of our counties. This was done using REMI's 156 sector detail of projected employment. This growth rate was applied to each Block Group's 1997 employment data in each of TransCAD's industry groups.

(iv) External Stations

Growth rates were applied to the productions and attractions at the external stations to obtain levels for the year of 2003, 2010, 2020, and 2025. These growth rates were also factored into the external to external trips.

2. Regionally Significant Projects

The travel demand model's roadway network was adjusted to represent roadway characteristics in the year of 2003, 2010, 2020, and 2025. Improvements identified in the Short and Long Range Elements of the Regional Transportation Plan were incorporated into the model. The roadway projects for forecast years are listed in Table 9-1.

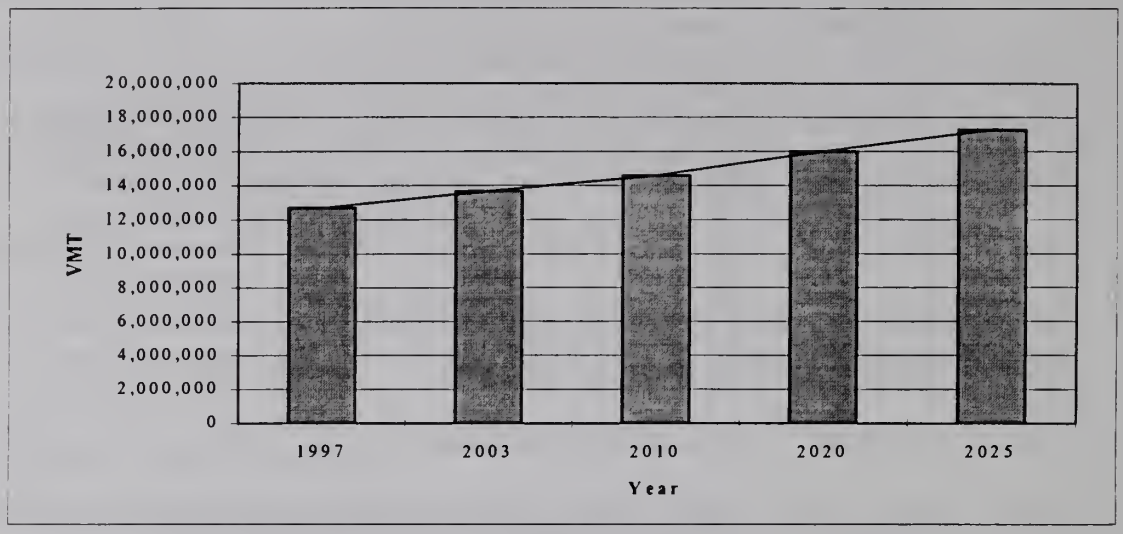
Table 9-1 Proposed Regional Improvements included in the Regional Transportation Model

Model Analysis Year	Community	Project Description
2003	Hadley, Northampton	Calvin Coolidge Bridge widening, Hadley/Northampton - increase existing capacity from 3 lanes to 4 lanes
2003	Hadley	Route 9 widening to four lanes, Hadley - from Calvin Coolidge Bridge to West Street
2003	Springfield	Berkshire Avenue signal coordination, - signals at Page-Berkshire, Cottage-Berkshire, Hervey - Berkshire, Wilbraham - Bradley
2003	Springfield	Reversal of 4 existing I-91 ramps, Springfield
2003	Springfield	Reconstruction, spot widening, and signal coordination on Boston Road, Springfield
2003	Chicopee	Memorial Drive signal coordination
2003	Hadley	Route 9 signal coordination
2003	Westfield	Route 20 signal coordination
2003	Holyoke, West Springfield	Route 5 signal coordination, Holyoke/West Springfield. Construct a new collector road to showcase cinema, West Springfield.
2010	Westfield	Route 10/202 Great River Bridge - two bridges acting as one-way pairs.
2010	Springfield	Blunt Park connector (new roadway between Roosevelt Avenue and Bay Street, Springfield) - runs between Bay Road and Roosevelt Ave. assume a two lanes road.
2010	Springfield	New slip ramp from I-291 to East Columbus Avenue
2010	Springfield	Reconstruction, widening, and signal coordination on Parker Street, Springfield
2010	Northampton	Road widening on Damon Road from Rte 9 to King St.
2010	Chester	Maple St bridge restoration as a one-way bridge.
2020	Agawam	Route 57 Phase II new limited access highway from Route 187 interchange to the Southwick Town Line.
2020	Holyoke	Elmwood Bypass - new roadway from I-391 to Lower Westfield Road, Holyoke
2020	Agawam, Longmeadow, Springfield	Relocate the South End Bridge south, eliminate Route 5/57 rotary, and construct a direct ramp from the South End Bridge to Route 57. Fix existing lane reduction problem on I-91 NB at Exit 3.
2025	Northampton	Connector roadway between Route 10 and Route 66, Northampton - two lanes road intersects with Old South Street.
2025	Ludlow, Springfield	Route 21 bridge reconstruction (possible to be widened as well)
2025	East Longmeadow	Improvements to the East Longmeadow Rotary.

3. Vehicle Miles Traveled and Daily Emissions

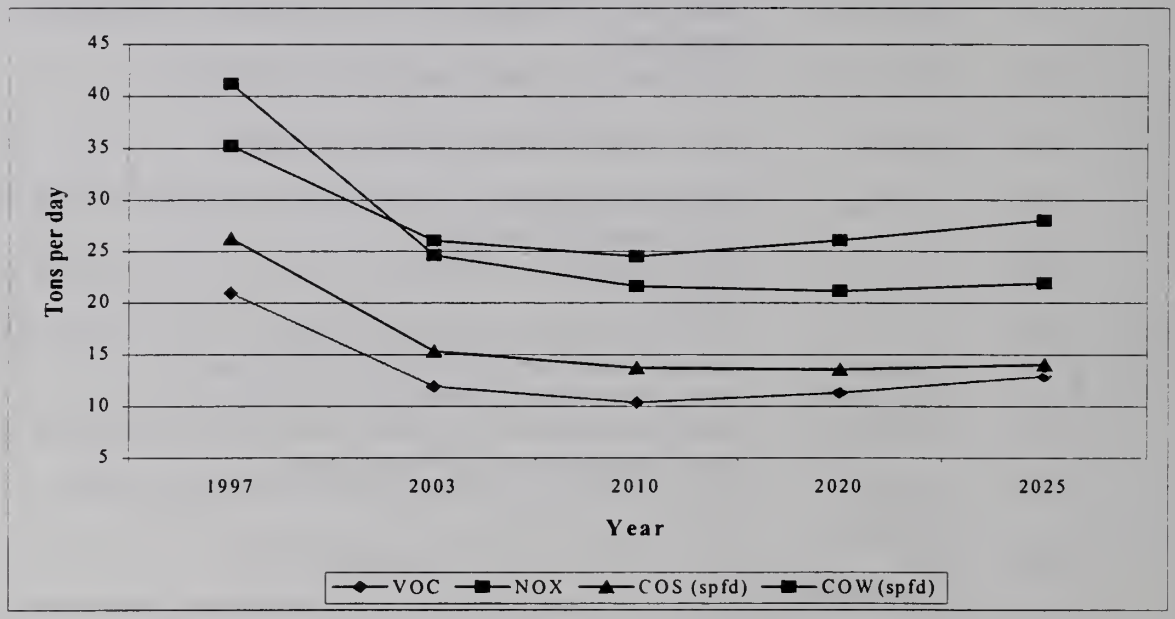
The total Vehicle Miles Traveled (VMT) was estimated for the model years of 1997, 2003, 2010, 2020, and 2025. The total VMT is shown in Figure 9-2. As shown in Figure 9-2, the total VMT is projected to increase by an average of 7.5% per year from 1997 to 2003 and 6.9% per year from 2003 to 2010. VMT increased by 9.6% per year from 2010 to 2020 and 8% per year from 2020 to 2025.

Figure 9-2 – Estimated Future VMT



The daily emissions for the Pioneer Valley Region were also calculated for each of the five analysis years. This analysis evaluates the change in ozone precursor (VOC and NOx) emissions and carbon monoxide summer (COS) and winter (COW) emissions in Springfield as a result of implementation of the recommendations of the RTP. The daily emissions output for the region is shown in Figure 9-3.

Figure 9-3 – Daily Emissions Output for the Pioneer Valley Region



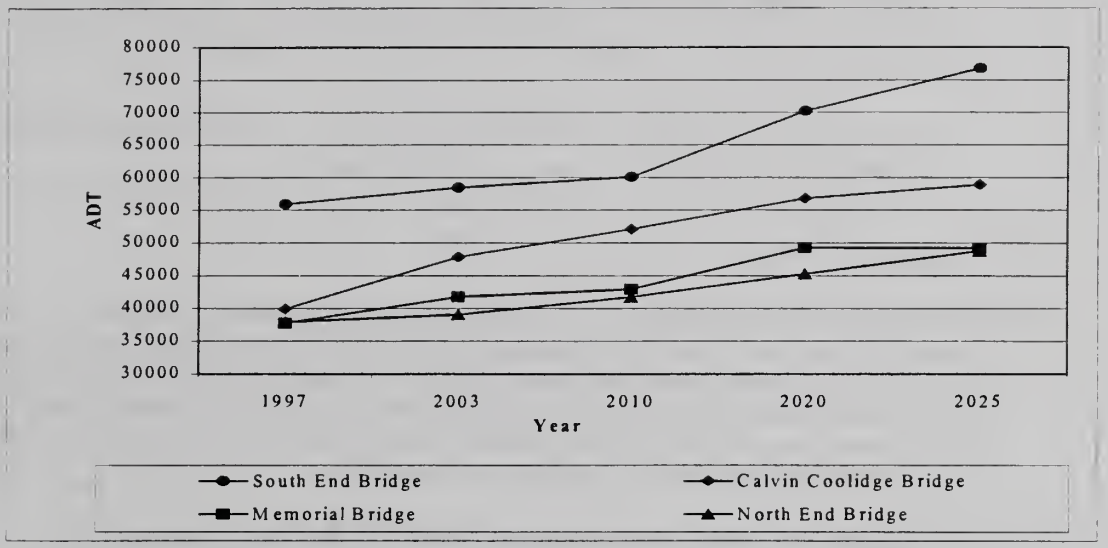
As shown in Figure 9-3, there is a significant reduction in VOC and NOx emissions for the Pioneer Valley Region, as well as COS and COW emissions for the Springfield area from 1997 to 2010. Emissions begin to increase slightly from 2010 to 2025, however they remain within the parameters of the established budget for the non-attainment area.

4. Future Traffic Volume Projections

a) Bridges

The Average Daily Traffic (ADT) on some of the regions bridges was projected for all five model years. The area bridges include the South End Bridge, Calvin Coolidge Bridge, Memorial Bridge, and North End Bridge. This information is shown in Figure 9-4.

Figure 9-4 – Projected Average Daily Traffic on Area Bridges

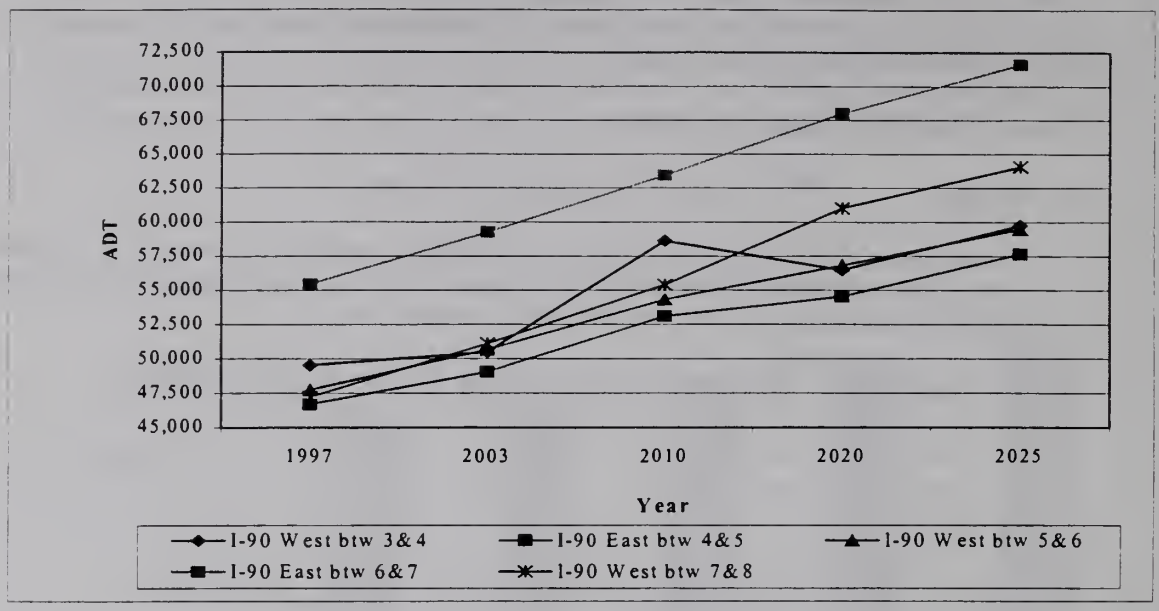


As shown in Figure 9-4, the ADT on South End Bridge is projected to significantly increase from 2010 to 2020. This is likely the result of the proposed improvements to the South End bridge and Route 5/57 rotary project, currently in the 2020 model analysis year. The West Columbus Avenue Urban Revitalization Project, which includes the expansion of the Basketball Hall of Fame, also impacts traffic volumes on the Springfield area bridges.

b) Interstate 90 (Massachusetts Turnpike)

Traffic volumes for Interstate 90 (I-90) are shown in Figure 9-5. Volumes on I-90 within the PVPC region are projected to steadily increase between exits 4 and 8 from 1997 to 2025. The ADT on I-90 between exit 3 and exit 4 increases sharply from 2003 to 2010 and then declines somewhat from 2010 to 2020. This is likely a result of a projected decrease in population in this area of the region. As information becomes available from the 2000 Census, this could change, as new projections will be developed based on the actual trends experienced from 1990 to 2000.

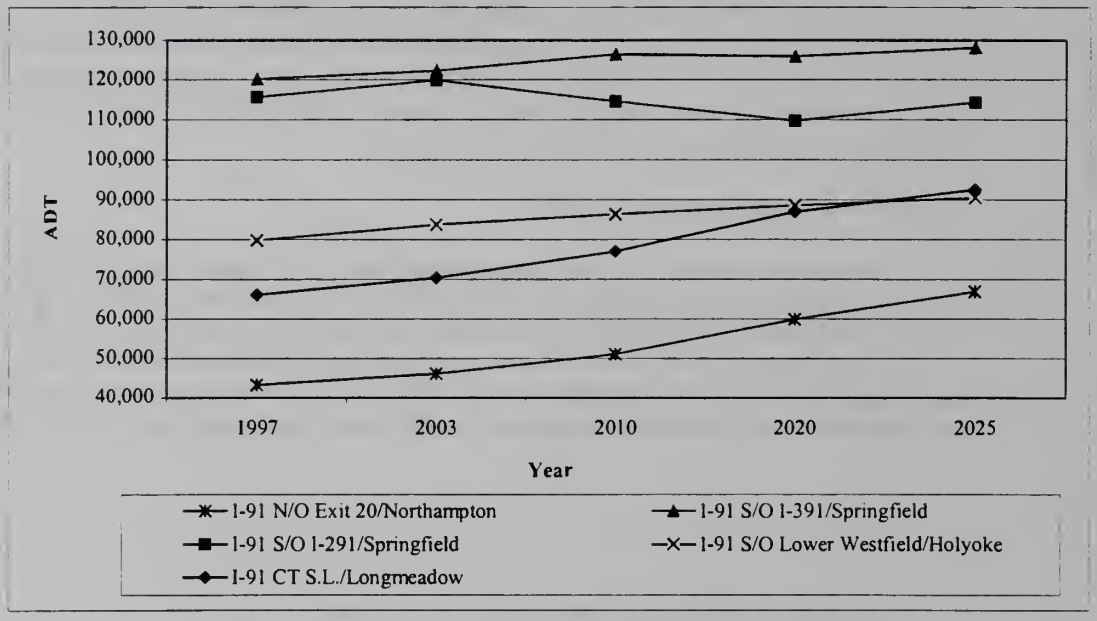
Figure 9-5 – Projected Average Daily Traffic on Interstate 90 (MassTurnpike)



c) Interstate 91 (I-91)

The ADTs on I-91 were projected for all five model years and are shown in Figure 9-6. Traffic volumes are projected to steadily increase north of exit 20 in Northampton and at the Connecticut State line while volumes remain fairly steady south of I-391 and near exit 16 in Holyoke. The most surprising trend occurs south of I-291 where traffic is projected to decrease from 2003 to 2020. This decrease is likely the result of improvements to East and West Columbus Avenue associated with the Basketball Hall of Fame expansion project.

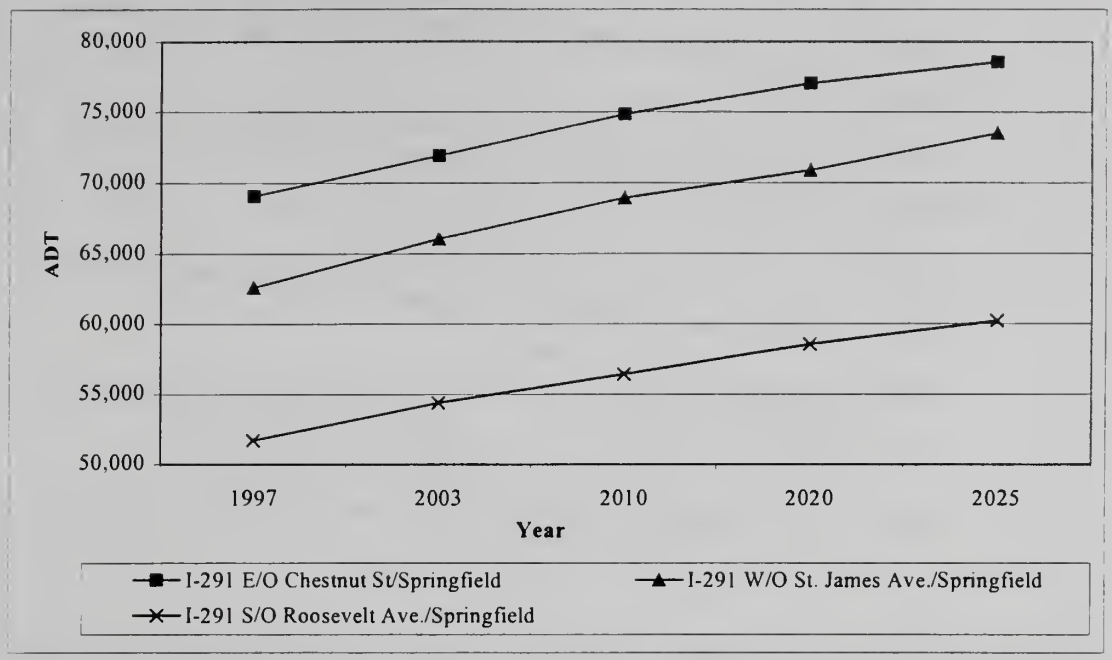
Figure 9-6 – Projected Average Daily Traffic on Interstate 91



d) Interstate 291 (I-291)

Figure 9-7 shows the projected traffic volumes for three locations on I-291 in Springfield. Steady increases in traffic volumes are projected for all three locations in this area.

Figure 9-7 – Projected Average Daily Traffic on Interstate 291



e) Interstate 391

Traffic volumes for Interstate 391 (I-391) are shown in Figure 9-8. Moderate increases in traffic volumes are projected for this area with the except for north of its interchange with I-91. Volumes in this area decrease slightly from 2010 to 2020, most likely as a result of a projected decrease in population.

f) Arterial Roadways in the Pioneer Valley Region

Average Daily traffic volumes were projected for some of the major arterial roadways in the region for all five analysis years. This information was summarized for each geographical sector (Northeast, Northwest, Southeast, Southwest) of the region on is shown in Figures 9-9 – 9-12. Traffic volumes are expected to increase on all four roadways in the northeast section of the region with the largest increases occurring on Route 9 at the Amherst/Hadley line. Conversely, slight to moderate increases are projected for the northwestern section of the region with the largest increases occurring on Route 5 in West Springfield from 2010 to 2020.

The ADT on arterial roads in the southeast of the region shows slight increases and decreases between each analysis year for all four roadways. These peaks and valleys likely mirror the projected increases and decreases in population and employment for these areas. Traffic volumes on Route 20 at the Westfield/West Springfield line are projected to increase dramatically from 1997 to 2003. This is likely due to projected increases in employment for this area. Route 57 is also projected to experience large increases in traffic volume west of Route 75 from 2010 to 2020

as a result of the Route 57 Phase II expansion project which would extend the limited access highway in this area.

Figure 9-8 – Projected Average Daily Traffic on Interstate 391

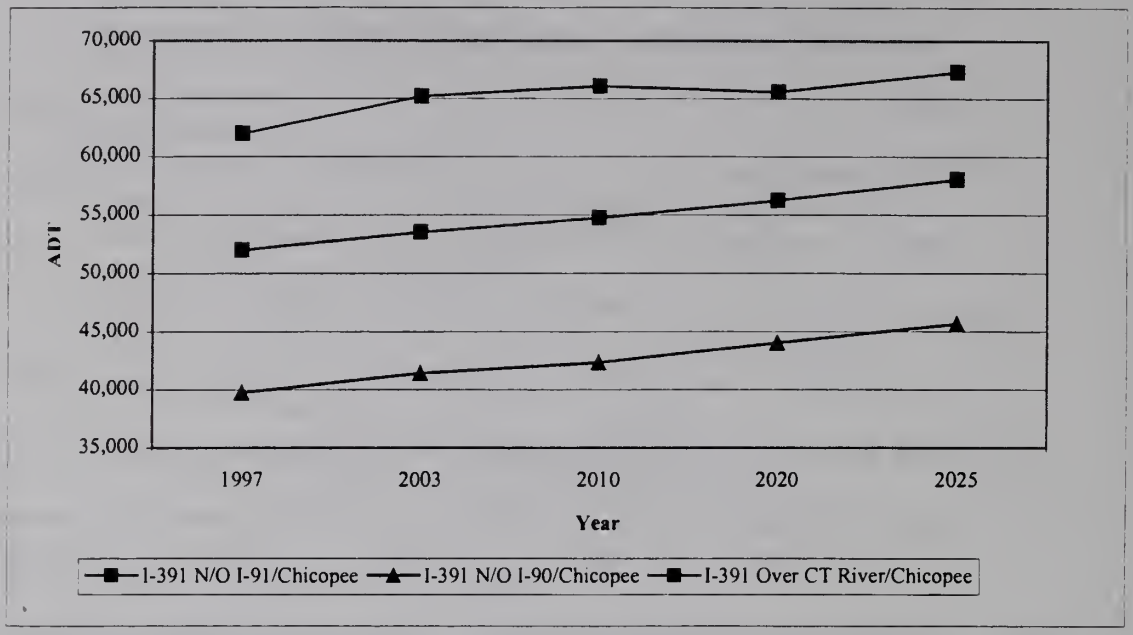


Figure 9-9 – Projected Average Daily Traffic on Arterial Roads in the Northeast

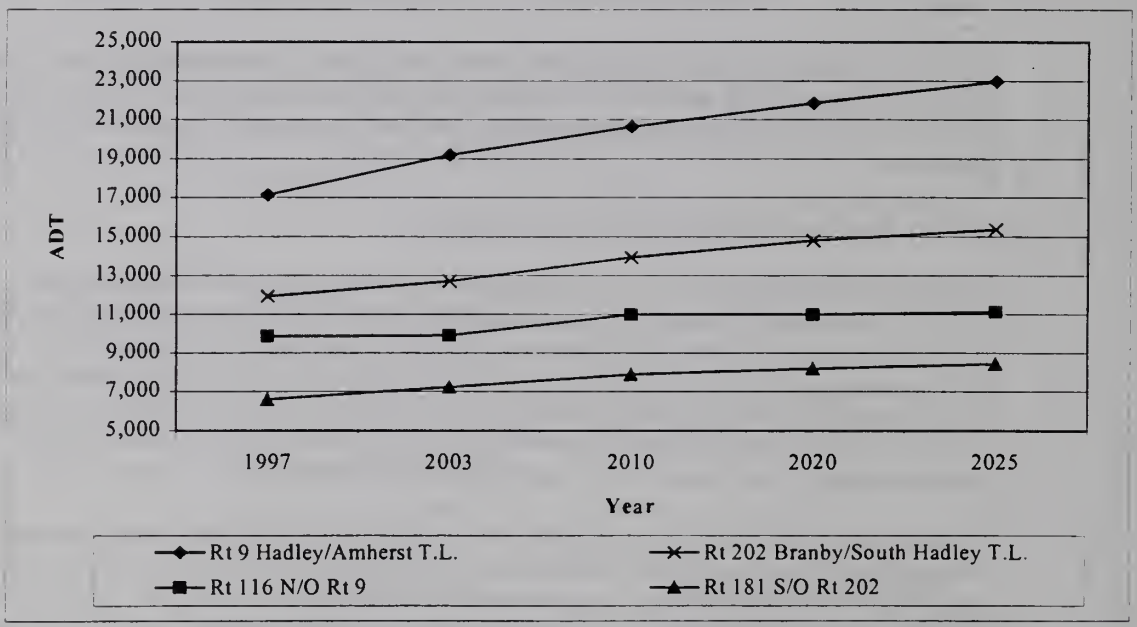


Figure 9-10 – Projected Average Daily Traffic on Arterial Roads in the Northwest

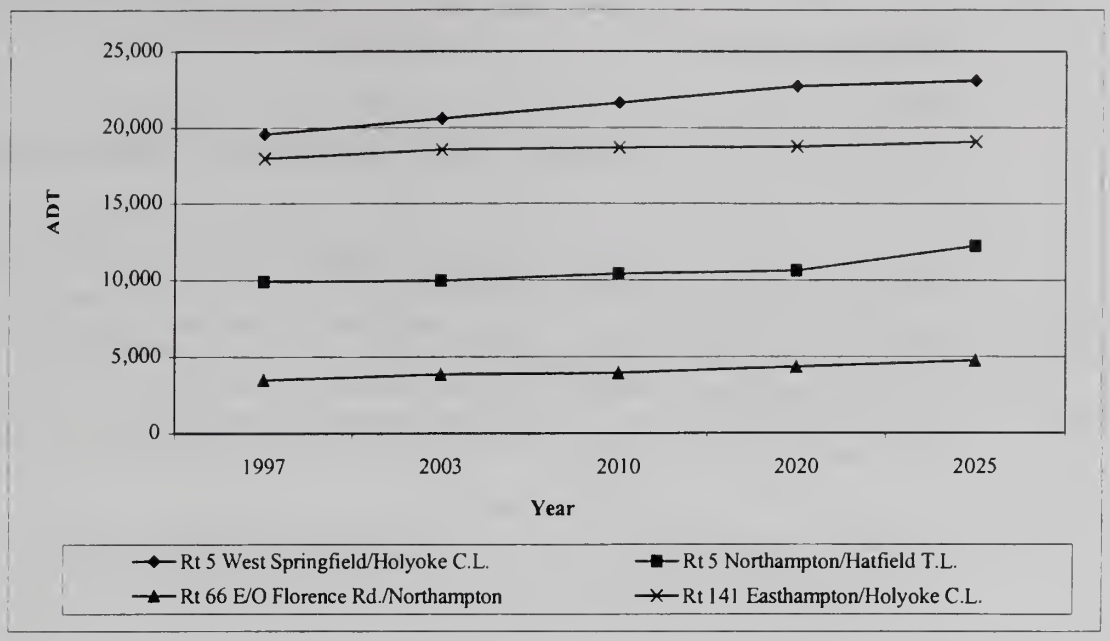


Figure 9-11 – Projected Average Daily Traffic on Arterial Roads in the Southeast

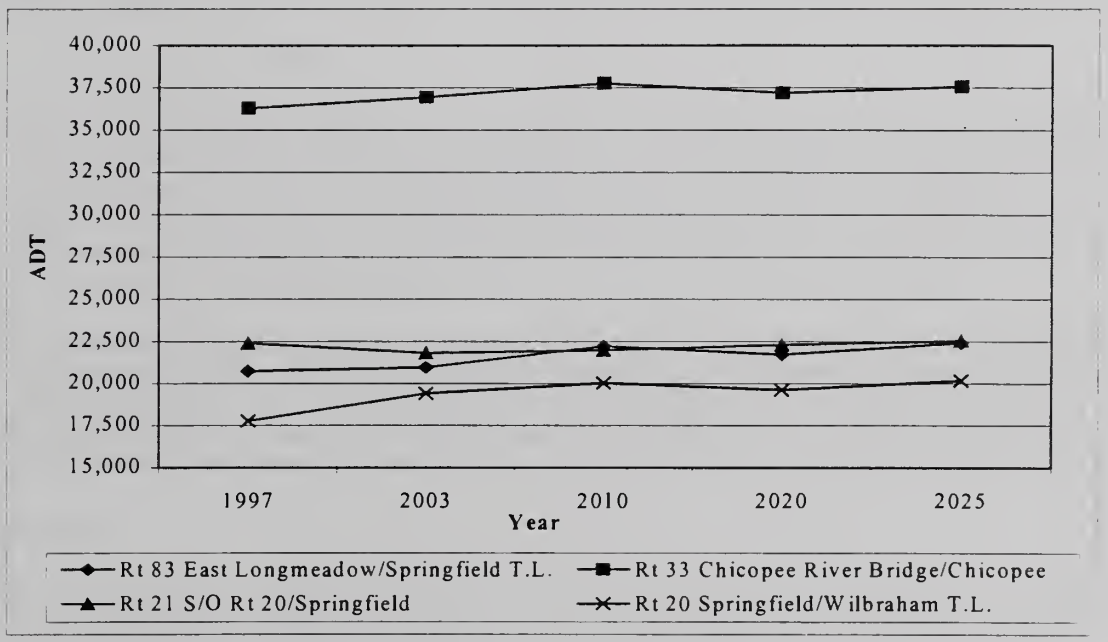
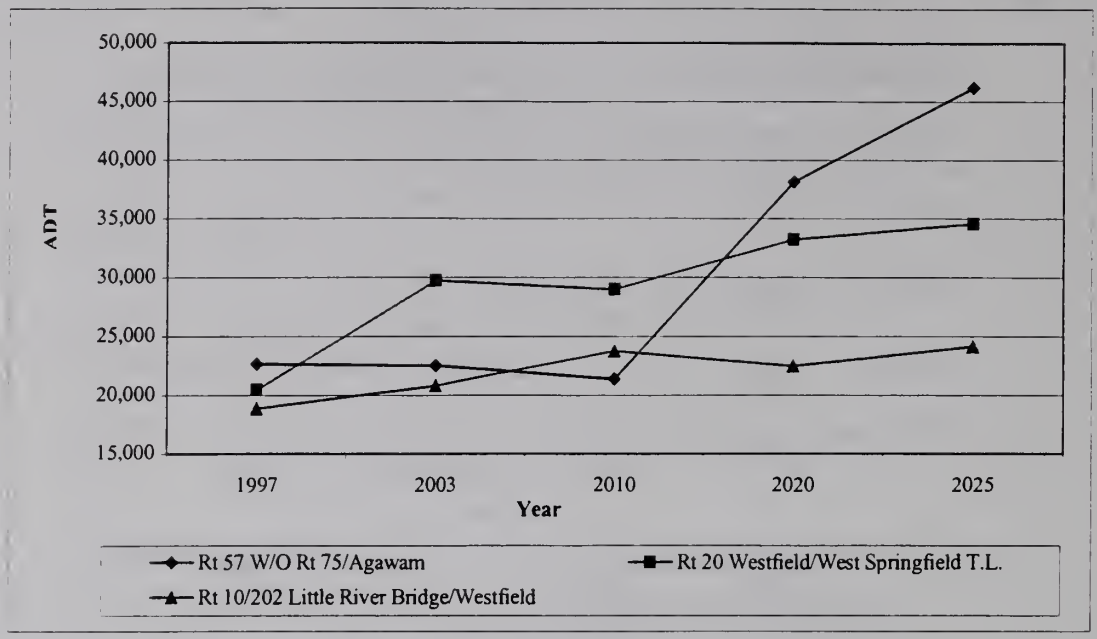


Figure 9-12 – Projected Average Daily Traffic on Arterial Roads in the Southwest



CHAPTER 10

LONG RANGE STRATEGIES AND PROJECTS

A. HIGHWAY SYSTEM IMPROVEMENT STRATEGIES

The goal of the RTP focuses on the attainment of a safe and dependable transportation system. In a first step to achieve this goal, the system's present and future needs have been identified. The second step is to develop a plan of action to address these needs while adhering to the policies and objectives of the RTP. The third and final step towards the RTP goal is to implement program improvement activities that will enhance the transportation system. This process is continuous and as improvements alleviate problems in the regional transportation system the goal of the RTP is achieved.

Priorities are required to address transportation needs of the region. The priorities are based in part on the issues concerning our existing systems as well as its long range needs. The equally important priorities of improvement activity for the Pioneer Valley Region are presented below:

- Safety;
- Congestion Relief;
- Preservation;
- Enhanced Mobility; and
- Environmental Improvement.

Improvement proposals should focus on these items as a set of objectives to be achieved over the long range. In achieving these objectives, the first alternative for consideration should be directed toward the improvement of existing facilities rather than construction of new facilities. In either case, a complete analysis of alternatives is necessary prior to the recommendation of an improvement action. The resultant action will, therefore, be consistent with the cost effective, environmentally aware, efficient objectives identified in the RTP.

In the absence of analytical support, the proposed plan of action will present a general course in which the above mentioned priorities will be addressed. Communication with local officials will continue to define the alternatives to be analyzed. Regardless, the proposed plan of action will be financially constrained by the estimates of future apportionments in the Pioneer Valley Region through the year 2025, and the policies identified in the RTP.

1. Safety

The highest priority within the Pioneer Valley region related to safety is the rehabilitation of the bridge system. Of the 677 bridge structures within the region, nearly 100 have been rated as structurally deficient. The continuous deterioration of bridge structures without restorative measures presents a serious problem in terms of safety as well as cost effectiveness. The plan of action for the Pioneer Valley Region is to perform regular, routine maintenance before conditions deteriorate to unsafe and/or irreparable conditions.

The estimated cost for bridge projects measured from past expenditure averages to be $650,000 for rehabilitation projects and 3 million dollars for replacement projects. MassHighway will administer funding for bridge improvements in the Pioneer Valley to the maximum extent possible in a prioritized and cost effective manner.

Safety also focuses on minimizing the number of high accident locations within the Pioneer Valley Region. Intersections listed on the states top 1,000 list of accident locations will be examined through analysis of the accidents, followed by proposed improvements to eliminate hazardous conditions.

2. Congestion Relief

The TEA-21 legislation directly addresses congestion mitigation as a planning activity as well as a funding source. Areas of congestion or travel conditions that are no longer acceptable to the public must be identified as target areas for improvement. The improvement strategies must first consider maximizing the efficient use of existing facilities prior to the recommendation of expansion. A number of these strategies include actions other than roadway capacity expansion, such as travel demand management, traffic operations improvements, growth management, and alternate modes of travel.

Areas of congestion will be identified through the congestion management system, the regional travel demand model or local input. Performance measures are utilized to indicate the level of severity of congestion for each area. Routine monitoring of these areas will be conducted to determine if the conditions are "re-occurring" or "intermittent". For those areas that are "re-occurring" they will be designated as a congested area or corridor. Priority attention will be given to the relief of those corridors designated as congested. Under the current TIP project priority process, projects that are designed to alleviate these congested areas receive higher priority than other projects.

Other methods of improvement or trip reduction must be analyzed and considered prior to the expansion of capacity. These activities should also be incorporated, if possible, with any capacity improvement in the congested areas. Regional congestion mitigation actions that improve travel flow efficiency or reduce single-occupant vehicle travel are also eligible for federal funds. These projects include traffic signal coordination projects, high occupancy vehicle lanes, car and van pool service, alternative mode of travel expansion and intelligent transportation systems. The objective of these activities is to reduce congestion and in turn improve air quality throughout the Region.

Several studies and other projects that target congestion relief are scheduled for the near future in the Pioneer Valley. The PVPC, as part of the congestion management system, is conducting a study of traffic signals along Route 5 in West Springfield; worked with a team of consultants to identified improvements for the East Longmeadow Rotary; and, will assist MassHighway District 2 in construction mitigation efforts for the Calvin Coolidge Bridge rehabilitation project in Hadley. The PVTA has implemented new express bus service between Northampton and Amherst as a congestion relief effort on Route 9. A regional traffic operations center will be constructed as part of the Calvin Coolidge Bridge rehabilitation project

3. Preservation

Pavement Management is a systematic process that collects and analyzes pavement information used as input in selecting cost-effective strategies for providing and maintaining pavement. The Pavement Management System (PMS) now provides a consistent set of recommended improvement actions based on a series of analysis including investment analyses. This feedback will be used as a prioritization measure in determining the appropriate selection of projects based on need and benefit/costs.

The programming of the region's apportionment of highway funds available for roadway preservation will be directly associated with the region's PMS. All projects to be considered for federal funding will be required to undergo PMS analysis and will be prioritized based on the PMS findings.

Included in the financial element of this plan is a line item for the maintenance and preservation of the current transportation infrastructure. The funds included in this line item will be used for resurfacing and reconstruction of roadways and rehabilitation of bridges. Table 10-1 exhibits the financial need for these efforts which must be aggregated since most projects under this category are not regionally significant.

Table 10-1 - Maintenance of the System - Annual Allocation

Category	Unit Cost	Annual Units	Annual Cost	1998-2025 Cost
Pavement	$250,000/mile	70 miles/yr.	$ 17.5 M	$ 402.5 M
Bridge	$1.5 M/bridge	15 bridges/yr.	$ 22.5 M	$ 517.5 M
Other			$ 4.2 M	$ 96.6 M
			$ 44.2 M	$1,016.6 M

Source: PMS, TIP from last five years.

4. Enhanced Mobility

Enhancing mobility, like congestion relief, depends heavily on the reduction of vehicle miles traveled and improved highway operations. Intelligent transportation systems will play a vital role in enhancing the mobility of the residents of the Pioneer Valley. The Intelligent Transportation Systems Strategic Deployment Plan for the Springfield Metropolitan and Pioneer Valley Region was recently completed for the region. The study organizes and prioritizes ITS applications that are beneficial to the regional transportation network. ITS can improve the operational efficiency of all modes from centralized traffic signal control and automated vehicle locating systems to commercial vehicle applications and automated traveler information systems. They can increase tourism, encourage economic development and most importantly, mitigate areas of traffic congestion. The recommendations of the strategic deployment plan will be integrated into to future transportation planning studies and projects in the region in compliance with the National ITS Architecture. In addition, the recommendations will be enhanced and expanded when appropriate to promote information sharing and linkage of the Pioneer Valley ITS system to other neighboring projects.

B. TRANSIT SERVICE IMPROVEMENT STRATEGIES

1. Regional Transit Partnerships

Increasingly, commuter travel patterns have extended beyond the Pioneer Valley to adjacent regions and metropolitan areas. PVTA has worked with connecting transit systems in the past to improve connections between service areas. In the future direct partnerships will be required to provide the services needed by the regions commuters, businesses and employers.

Over the past year Hartford's Capital Region Council of Governments has led a major investment study to develop a regional transit strategy. One component of the recommended alternative is the development of commuter rail service between New Haven, Hartford and Springfield. PVTA intends to explore the opportunities of partnership with Connecticut Transit to develop commuter rail service to the Springfield Union Station.

2. Real Time Passenger Information Systems

The natural extension of the continuing PVTA investment in ITS technologies and systems will be the implementation of Real Time Passenger Information. PVTA is considering the development of ITS information kiosks at key locations throughout the region and bus arrival information systems at bus shelters.

3. Intermodalism

With the advent of ISTEA, regions are faced with new regulations regarding intermodalism. As stated in the goal and objectives of this plan, the Pioneer Valley's basic aim is to coordinate all modes of transportation into one system; thereby, increasing the Region's mobility in an economical fashion. Frequent bus (or train) service to park and ride lots, ridesharing programs through employer cooperation, and intra-city and inter-city mode coordination are all ideas addressed in the short range element, but require further examination in the future. A high level of intermodalism can reduce the travel time needed to complete trips using public transportation. Enhanced service along with the marketing of the clean air benefits of public transportation must be emphasized to lure people from single occupant vehicles. The creation of intermodal centers at strategic locations will play a major role in this effort. The renovation of Union Station will serve as an intermodal center for Springfield and the surrounding communities. By serving the facility with PVTA, Peter Pan, other intercity bus carriers, local taxi services, long-distance Amtrak services and commuter rail, the connections between these services will be seamless and thus enhance the mobility of the residents in the region. Westfield's planned intermodal center will provide this role in a smaller scale for that community as well as serve as a feeder to the Springfield Union Station. The possibility of establishing an additional intermodal terminal at the University of Massachusetts-Amherst is being explored. Other intermodal facilities locations being considered include Holyoke and Northampton.

4. Accessibility

Now that PVTA's fixed route transit system is fully ADA accessible, efforts are needed to encourage paratransit riders to make their trips using the fixed route system. Cost per passenger on the fixed route or community routes are significantly less than that of a paratransit route. Ridership levels on the paratransit system are pushing the systems capacity while there is ample capacity for these riders on the fixed-route buses. In addition, many paratransit riders are capable of riding fixed or community routes. Expansion of the new Community Route service and the development of incentives are required to attract riders from the paratransit system back to the fixed route system.

C. MOVEMENT OF GOODS SYSTEM IMPROVEMENT STRATEGIES

1. Doublestack Clearance

Lack of adequate clearance along rail lines is a major obstacle to improving the economic efficiency of rail freight systems. Doublestacking rail cars can reduce the length of freight trains minimizing the delay and safety problems at railroad crossings while maintaining or even expanding its load. Many bridges are roadways passing over the tracks: when these bridges are to be reconstructed or repaired, the clearance over the tracks should be increased to accommodate doublestacked trains. Clearances in the Pioneer Valley have already been raised to accommodate rail cars with 17 feet of stacked containers (one 9½ft and one 8½ft.). In the future, 19 feet of clearance will be required to accommodate trains with two 9½ft containers.

2. Improved Access to Intermodal Terminals

As mentioned in the Needs and Issues section, the Intermodal Management System (IMS) has been designed to include access roads to intermodal facilities on the National Highway System. Both rail/truck facilities in the Pioneer Valley currently experience some access problems. As the IMS is developed, strategies and projects to alleviate these regional access issues should be advanced.

3. Increased Public/Private Cooperation

Since the movement of freight is almost exclusively a privately operated industry, the opportunity exists to improve public/private cooperation. Private transportation providers are entitled to representation on the Joint Transportation Committee, but rarely exercise this option by attending the meetings. Future JTC initiatives should encourage more participation from private providers. Through greater cooperation, transportation improvements will have an increased benefit both in the operation of the transportation system and the economy as a whole.

4. ITS Commercial Vehicle Cooperation

ITS Commercial Vehicle Operation application may be an area for public investment to maximize the efficiency of the movement of goods throughout the region. As the Pioneer Valley Region makes investments in a highway ITS system on its major corridors the successful integration of the Commercial Vehicle Fleets allows the managed increase in use without the corresponding increase of congestion from goods movement.

D. NON-MOTORIZED TRANSPORTATION STRATEGIES

Non-motorized transportation in the Pioneer valley can be enhanced through policy and program changes including engineering, education, enforcement, and encouragement efforts. The actions described below are designed to change either the physical or the policy environment for pedestrians and bicyclists in the Pioneer Valley. A multi-pronged approach is required to make the Pioneer valley a safe connected place to walk and ride a bicycle.

1. Engineering

a) Infrastructure

A properly designed, well-maintained transportation infrastructure is vital to encourage walking and bicycling as the physical environment directly affects the decision to walk or ride a bicycle. The PVPC must identify deficiencies in the regional transportation system and advance projects to correct deficiencies in the regional transportation system.

b) Policy

The physical environment is constantly changing. As a result, it is necessary to assure ongoing support for and encouragement of walking and bicycling as reasonable transportation options by creating and influencing public policy. It is especially important to establish pedestrian and bicycle-friendly public policy that governs engineering activities in the valley, including the planning, design, construction, and maintenance of public roadways and transportation projects.

2. Zoning and Development

Zoning ordinances and bylaws are specific forms of public policy that can be used by local government to support walking and bicycling. The PVPC must encourage and support local efforts to develop municipal bylaws to advance the use of pedestrian and bicycle modes in the Pioneer Valley region.

3. Education

Comprehensive education programs are necessary to ensure the safe use of transportation facilities and promote the development of physical and policy changes to encourage bicycling and walking. The PVPC must develop regional workshops and programs to provide continuing education in the area of non-motorized transportation.

4. Enforcement

Enforcement is an essential component of encouraging people to obey the rules of the road. The PVPC must work with the local communities and the Governor's Highway Safety Bureau to secure funding to implement law enforcement programs to support existing traffic laws such as pedestrian crosswalk laws to both educate users and enhance safety in the region.

5. Encouragement

Encouragement is the heart of any community's successful efforts to make walking and bicycling viable means of transportation. PVPC, local governments, colleges and universities, businesses, and key community leaders must cooperate to make bicycling and walking viable transportation alternatives.

6. Build an Intermodal Pedestrian, Bicycle and Transit Network

- Build a regional network of pedestrian and bicycle trails to provide opportunities for residents to bike or walk to work or shopping. Create intermodal links to transit facilities and service.

- Take advantage of public grant opportunities to build a regional trail system. This trail system should provide linkages between key destinations, such as employment and shopping centers and residential areas. The proposed extensions to the Norwottuck Rail Trail are shown in Figure 10-1.

- Seek grant funds to develop bicycle amenities such as safe and secure bicycle racks and lockers in key heavy use areas, such as downtowns, town centers and transit stops.

- Use zoning to require that new developments provide bicycle and pedestrian-friendly features, such as linkages to bikepaths, sidewalks, and transit access features. (Examples: Davis, CA; Irvine, CA)

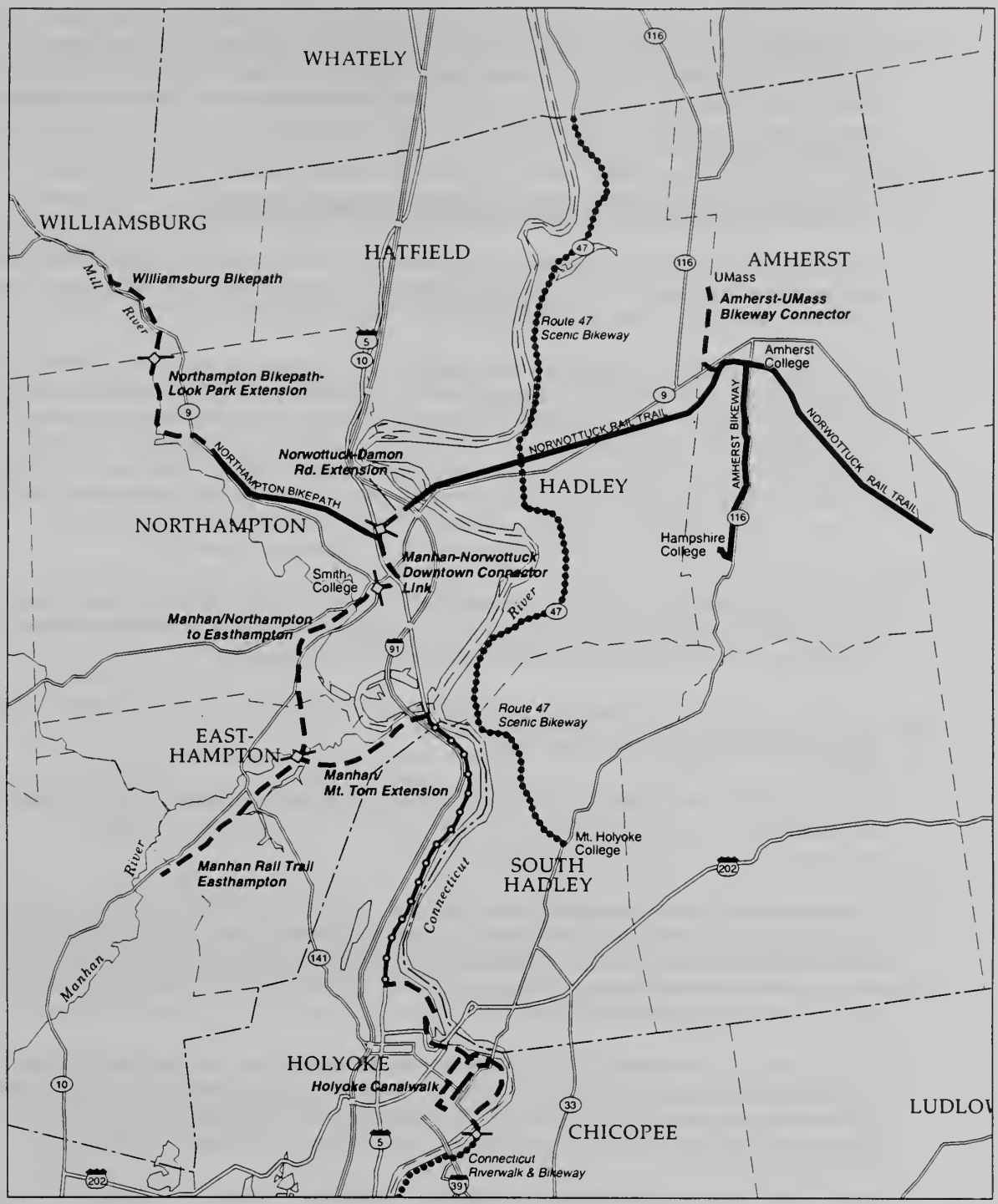
- Work with existing businesses and other landowners to develop linkages to pedestrian and bicycle paths. (Examples: Norwottuck Trail, MA; Pinellas Trail, FL)

- Create bike lanes on key routes by striping outer lanes or building separate trails. Require new residential developments to set aside space for bike paths or lanes separate from auto traffic.

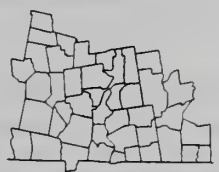
- Establish pedestrian-friendly street design standards within subdivision regulations, including requirements such as narrower streets, medians, bike lanes, and elimination of free right turn lanes.

- Develop park and ride lots.

Norwottuck Rail Trail Bikepath Extensions in the Pioneer Valley Region



Existing Bikepath
Existing On-road Bike Route (signed)
TEA-21 High Priority Project (planned)
Project Terminus
Other proposed Bikeway Extension (on-road and off-road)



Produced by
Pioneer Valley Planning Commission
26 Central Street
West Springfield, MA 01089
October 2000

NORTH

Scale
0 5 Miles
0 5 Kilometers

E. LAND USE AND DEVELOPMENT INIATIVES

As explained in the Needs and Strategies section, if people do not need to travel great distances to meet their basic needs, i.e. work, shopping, school and recreation, then there will be less demand for expensive transportation facilities that do not make efficient use of land, i.e. roads. The following strategies are designed to facilitate compact growth and development that is pedestrian, bicycle and transit friendly. The following initiatives must be adopted and implemented by the 43 communities comprising the Pioneer Valley.

1. Encourage Traditional Neighborhood Developments (TNDs)

Create incentives in zoning and subdivision regulations to promote pedestrian-friendly TNDs. TNDs have grid-like street patterns with sidewalks and street trees, medium to high density housing, nearby public open space and are within walking distance to shops and services.

- Adopt TND residential zoning regulations to permit lots of one-quarter to one-ninth acre with modest front yard set backs of 15 to 20 feet. Homes should be clustered around public commons, green belts, parks or playgrounds. Houses should be predominantly single-family homes, with some row houses; apartments and accessory apartments mixed in. Garages or parking should be placed to the rear or along alleys. Houses often have picket fences or hedges to separate the front yard from the sidewalk and front porches. Convenient corner stores should be allowed in residential neighborhoods, allowing residents to walk to the store. (Examples: Chapel Hill, NC; Jacksonville, FL; Kentlands in Gaithersburg, MD; York County, SC; Loudon County, VA; Beaufort County, SC)

- Adopt TND subdivision regulations to encourage narrower streets with two ten-foot travel lanes for traffic calming, gridded streets for traffic flow improvements, sidewalks, shade trees planted at twenty-foot intervals between streets and sidewalks, and on-street visitor parking.

2. Promote Compact, Mixed-use Development Near Existing Town Centers and in Designated New Growth Centers

- Provide incentives for urban infill, clustered residential and mixed-use villages within or immediately surrounding town centers or designated community growth centers in order to increase pedestrian/bicycle access, jobs and affordable housing.

- Adopt commercial center zoning regulations to provide for intimate Main Street shopping districts, with stores lined up along sidewalks and parking to the rear and along the curb. Building height should be 2-4 stories, with offices or apartments above first-floor shops. Storefronts should be brick, stone or clapboards, with awnings, and signs, which are subordinate to building architecture. Streets should have street lamps and shade trees.

- Encourage mixed-use projects, which combine residential, retail, office, and public institutional uses in compact, pedestrian-friendly villages or clusters. Mixed-use projects provide opportunities for people to live in close proximity to work, or to walk from the office to shopping or restaurants. (Examples: Boltwood Walk in Amherst, MA; South Hadley Commons, MA; Palo Alto, CA; Davis, CA).

- Create density-based zoning incentives to encourage development in growth centers, such as smaller lot sizes and setbacks (or no minimum lot size or frontage requirements), and increased heights. These incentives can be created through amendments to the table of dimensional uses in the zoning bylaw.

- Create use-based zoning incentives, to encourage uses such as institutions, museums, schools, public buildings and elderly and handicapped congregate housing to locate in growth centers, rather than in outlying areas. These incentives can be created through amendments to the table of uses in the zoning

bylaw, which allow these uses by right in designated community growth centers, and establish restrictions or Special Permit requirements in outlying areas.

- Retrofit suburban shopping centers to become community centers, by adopting zoning which requires new buildings at the street line, with pedestrian connections across parking lots, street trees and streetscaping. (Example: Mashpee Commons, MA)

- Control sprawl outside existing town centers and growth centers by creating disincentives for development. Establish lower land use zoning intensities and restrict uses, which are not appropriate for rural areas. Commercial development should be located in centers, not in auto-dependent, stand-alone buildings. Establish policies restricting extensions of public sewer, water and other infrastructure.

3. Create Incentives for Downtown Revitalization

- Streamline or update antiquated zoning regulations to promote mixed uses and infill development in downtown areas. Allow greater density downtown than in surrounding areas; for example permit 3-5 story mixed use buildings in central locations with proper design. Prescribe a balanced mix of commercial, residential, cultural and entertainment uses. Reduce parking requirements in higher density pedestrian oriented areas and promote shared or common parking lots. Revamp single-purpose districts to allow more flexibility of uses. Allow mixed uses in formerly single use buildings. (Examples: Bus Station Complex, Northampton, MA; downtown Amherst, MA)

- Revise zoning to promote downtown residential uses and add people, vitality to downtowns. Permit residential use of upper floors above street-level commercial uses. Allow lofts and artists spaces in former warehouse or industrial buildings. Provide density bonuses for downtown residential uses, or set aside downtown land for residential use only. (Examples: Phoenix, AZ; Peekskill, NY; Providence, RI; Portland, OR)

- Create public-private partnerships of civic leaders and property owners, such as Business Improvement Districts and downtown associations, to manage and market downtown's and to maintain or provide amenities, such as landscaping, street furniture, public art, pay phones, and rest rooms. Identify businesses and industries that would make a good fit with the community and actively market the downtown to these companies.

- Work to restore downtown's through Economic Target Areas or Main Street programs or other public-private community development organizations which can obtain seed money from banks and corporations to make loans, provide gap financing, purchase properties for resale and development and finance predevelopment market studies. Take advantage of available financing programs, such as CDBG grants, federal loan guarantees, historic rehabilitation tax credits and industrial revenue bonds. (Examples: Portland, OR; Denver, CO; Times Square, NY; Northampton, MA).

- Revise zoning to incorporate design, landscape, and streetscape standards to maintain community identity and historic character. Develop downtown zoning, including: standards to encourage pedestrian-scale development, architectural design standards, standards for signage on buildings. Building setbacks from public streets should be minimized to no more than 20 feet, and building facades should be varied and articulated. Revise parking bylaws to allow for an uninterrupted streetscape in the downtown, and allow flexibility in meeting parking requirements, such as shared parking lots. (Examples: Austin, TX; Stuart, FL; Amherst, MA)

- Exploit opportunities for specialty retail and service businesses targeted toward underserved urban markets, by providing grant assistance and tax incentives to businesses.

- Invest in upgrading physical infrastructure (i.e. transit shelters and stations, parking sewer, water) and improving downtown access. Improve parking through creation of multi-level parking garages and fringe lots with shuttle buses. Facilitate pedestrian movement with walkways and other connections.

- Invest in creating and improving urban greenspace, such as parks and greenspaces, pedestrian walkways, plazas and commons, and amenities.

- Create zoning and tax incentives to rehabilitate and recycle all previously-developed, available, vacant or underutilized city land before promoting use of greenfields (undeveloped open land).

- Restructure zoning to channel commercial growth, especially offices, into downtown's, rather than into highway strip developments, by allowing certain uses only in downtowns. Require retail use of ground level floors of downtown buildings, including parking garages.

- Make downtowns safe, comfortable and attractive. Make improvements to amenities, such as parks, streetscaping, and lighting. Provide security and employ safe place design standards. Identify crime hot spots and unsafe places downtown and address them with lighting, activity, improved sightlines, and eliminating entrapment spots. Coordinate special events programming, such as concert and festivals, to attract people to downtowns and activate public parks. Implement a signage program to direct visitors to key downtown destinations. Improve maintenance of downtown facilities to give the area a safe, well-cared-for appearance.

- Capitalize on the downtown's inherent capacity for street life and pedestrian activity. Implement a program of streetscape improvements, such as tree ways, lighting, furniture, paving, murals, tree lights, and banners. Enact zoning to permit sidewalk cafes. Institute traffic calming measures. (Examples: San Diego, CA; Northampton, MA; Mountain View, CA)

- Encourage government and private institutions, such as colleges, post offices, and museums, to retain or expand downtown offices and facilities, through zoning and other mechanisms.

- Promote revitalization of, and public access to, urban riverfronts. Promote sensitively designed riverfront development that is focused toward the river. Develop a network of riverfront walkways, trails and promenades. (Examples: Hartford, CT; Minneapolis, MN; Chattanooga, TN)

4. Develop Incentives for Open Space Community or Cluster Development

- Open space communities replicate the traditional New England village land use pattern by clustering single family homes on smaller lots surrounded by protected open space. Open space communities promote efficiency of land use, lower costs of development, roads and infrastructure, lower municipal maintenance costs, and preserve natural features such as waterways and farmland. Cluster development has been hampered in Massachusetts by antiquated state zoning enabling legislation, which requires a Special Permit for cluster projects.

- Develop zoning regulations to promote cluster development, such as major residential development ordinances or open space community development ordinances, as an alternative to standard large-lot subdivisions. (Example: Chesterfield, MA; Granby, MA; Amherst, MA; Southampton, MA)

- Incorporate limited mixed-use development options into open space community bylaws, such as limited business or office uses.

- Seek state legislation to allow by-right cluster development. Such legislation would eliminate the current requirement in M.G.L. Chapter 40a, section 9 for a Special Permit for any new cluster development. Relatively few cluster projects have been built in Massachusetts because it is easier and

faster to get approval for standard subdivision plans or ANR lots, which do not require Special Permits.

5. Improve Housing Opportunities and Neighborhood Quality

- Provide a wider variety of housing choices in existing residential neighborhoods, and create more livable, pedestrian-friendly neighborhood environment.

- Permit development of accessory or "mother-in-law" apartments in single family neighborhoods. Accessory apartments improve rental housing opportunities while maintaining the residential character of neighborhoods, particularly if apartments are attached to owner-occupied homes. (Example: Easthampton, MA)

- Adopt zoning to allow limited commercial service and convenience uses, such as corner stores, in residential neighborhoods to create opportunities to walk to needed services.

- Adopt inclusionary zoning regulations to provide opportunities for development of a mix of housing types, including affordable housing, within neighborhoods. Typically, inclusionary housing bylaws promote private market development of affordable housing by offering developers residential density bonuses in return for some affordable dwelling units. The developer must set aside a percentage of affordable housing units, usually 10-25%, in the development for low and moderate-income residents. (Examples: Lexington, MA; Newton, MA; Amherst, MA)

- Adopt zoning for elderly and handicapped congregate housing. Congregate housing provides a range of housing opportunities for elderly and handicapped persons, including senior apartments for independent living, life care facilities allowing the progression from independent living to nursing home care, and congregate dwellings with support services for residents. (Example: Granby, MA)

- Improve the quality of compact neighborhoods with the strategic placement of public amenities. Community centers, recreation facilities, schools, and libraries can all generate shared civic life, provide neighborhood meeting areas and spur neighborhood investment.

- Provide accessible open space close to homes in compact neighborhoods. Open space, such as bikepaths, parks, playspaces, and commons, enhances the quality of life in neighborhoods, provides recreational opportunities, and improve community safety and desirability.

- Enhance downtown neighborhoods through neighborhood public safety and public improvements programs. Create neighborhood policing and neighborhood watch programs. Improve street sweeping, trash collection, street lighting and streetscaping, and graffiti control. Promote housing improvements through tax rebates and loans for construction and rehabilitation of historic properties.

- Install traffic calming measures in residential neighborhoods to reduce speeds and discourage through traffic.

6. Redevelop Brownfields

- Facilitate the redevelopment of Brownfields sites, and other underutilized urban lands, throughout the region. Brownfields are formerly useful industrial lands, which sit neglected and out of the industrial land market because of contamination and high clean-up costs, liability concerns, and lack of site information. The region contains at least 450 known sites that are listed by the Massachusetts Department of Environmental Protection as being contaminated by pollutants other than petroleum. More than 75% of these sites are located in urban communities where a majority of the region's minority and low-income population lives. Side effects of neglecting Brownfields include increased

industrial development pressure on greenfields sites (farmland and open space) in outlying communities, and the loss of industrial jobs in the urban core. Other under utilized urban lands, such as Northampton State Hospital, should be redeveloped for economically viable uses.

- Identify and prioritize potentially developable abandoned, underutilized and/or contaminated sites within each community.

- Obtain federal or state seed money for Brownfields environmental site assessments.

- Market Brownfields sites and other underutilized urban lands suitable for redevelopment, by making an inventory of sites available to potential developers.

- Create public-private partnerships of municipal and state agencies, lending institutions, insurance companies, and adjacent landowners to work cooperatively to redevelop sites. Develop effective agreements between these parties to work together.

- Take advantage of existing state and federal programs which provide incentives for Brownfields redevelopment, such as the EOEA Clean Sites Initiative, which offers state tax benefits and priority status for state capital funding to sites within designated Economic Target Areas, and Community Development Block Grant funds targeted for Brownfields.

- Support new state legislation or local actions to provide incentives to redevelopment through public-private partnerships, financial assistance for site assessment and clean up, liability relief and tax benefits.

7. Encourage Transit-oriented Developments (TODs)

- Along bus transit lines, re-zone areas to allow for TODs. A transit-oriented development is a mixed use community within a 2,000-foot walking distance of a transit stop and core commercial area. TODs are concentrations of moderate and high-density housing, civic facilities, and mixed-use business establishments in a pedestrian-friendly and transit-served area.

- Create TOD zones within walking distance, about 2,000 feet, of major bus transit lines in urbanized areas, which allow for higher density and mixed use. Each TOD should have a mixed-use core commercial area located adjacent to the transit stop. Surrounding the core commercial area should be a mix of residential housing types, including small lot single-family, townhomes, condominiums, and apartments at a density of 10-26 dwelling units per acre. TODs should also include public uses, such as parks, plazas, greens, public buildings and public services. (Example: San Diego, CA; Mountain View, CA)

- Reduce parking requirements for developments in TOD zones, in anticipation of decreased automobile use.

- Create a comfortable pedestrian environment, with tree-lined streets and sidewalks and well-defined transit stops to promote transit use.

- Provide incentives to developers for installing transit amenities such as bus shelters or benches.

8. Establish Greenbelts and Blueways for Open Space Protection

- Create programs to protect key open space features, including "Blueways" to protect river corridors and lakeshores, and "greenbelts" to protect prime farmlands, mountains and ridgelines. Programs should also target abandoned rail lines and other special scenic or natural features. A contiguous

greenbelt around cities and towns should be designed to help contain urban growth. Greenbelts can provide recreational opportunities and wildlife migration corridors while protecting natural features. They balance urban development with the creation of parklands and open space.

- Build regional greenbelts, which are implemented through municipal open space acquisition programs, in cooperation with land trusts, and nonprofit groups. Establish municipal open space acquisition funds with annual appropriations and seek state open space grants or loans. Target regionally significant "special places" and environmentally sensitive lands for greenbelts, and identify these lands for acquisition in municipal open space plans. Hire local or regional open space coordinators to oversee implementation of the plan. Establish open space zoning bylaws with strong development restrictions (e.g. mandatory cluster provisions) for greenbelt areas. (Example: Amherst, MA)

- Adopt farmland preservation zoning to preserve prime agricultural lands. Several options are available to communities, including:

- Farmland cluster zoning, which requires clustering of houses on the less agriculturally productive portion of a parcel, while preserving the most important farmland soils as open space. (Examples: Amherst, MA; Granby, MA; Southampton, MA).

- Transfer of development rights ordinances, which the transfer of rights to develop property from parcels in a "sending zone", where open space and farmland is being preserved, to parcels in a "receiving zone", where more dense development is permitted. (Examples: Eden, NY; Buckingham, PA; Chesterfield, NJ; Sunderland, MA).

- Preserve not only farmlands but also farm operations, by creating economic and tax incentives to keep farms in business. Options include: "right-to-farm" districts; zoning bylaws which encourage farmstands, farmer's markets and other farm-related businesses; promotion and education on the benefits of state programs such as the Agricultural Preservation Restriction Program and Chapter 61a property tax reductions; targeted marketing programs for locally-grown farm products; seeking new state legislation for reduction of farm taxes, such as excise taxes on farm machinery.

- Require a dedication of protected open space, parks or recreational lands in close proximity to major residential developments, or a financial contribution to a municipal open space fund.

- Create blueways along rivers, lakes and streams by adopting river protection overlay zones, to supplement provisions in the Massachusetts River Protection Act. Control waterfront uses to ensure they are compatible with waterways and maximize public visual and physical access to waterways. (Examples: Chester, Chesterfield, Middlefield, and Worthington, MA)

- Preserve waterfront lands (or easements) for public access and open space to the maximum extent feasible; in order to provide waterfront trails, parks, boat and fishing access. Options include: zoning bylaws to encourage negotiated waterfront public access easements as part of waterfront developments; public acquisition of waterfront lands or easements through grant programs such as the Urban Self-help Program; land trusts dedicated to acquiring or accepting donations of waterfront lands.

- Seek municipal approval of real estate transfer taxes to fund a local or regional Land Bank for open space acquisition, pending approval of general state enabling legislation or special regional legislation for such taxes. Funds are raised for a land bank through a small levy on real estate transactions (e.g. 1% or 2%). Some land banks exempt the first (e.g.$100,000). (Examples: Nantucket, Cape Cod and Martha's Vineyard, MA)

9. Protect Environmental Quality and Prevent Pollution

- Establish zoning standards for improved environmental protection and pollution control.

- Protect drinking water sources by adopting water supply protection zoning overlay districts for reservoir watersheds and aquifer recharge areas. Bylaws should prohibit hazardous land uses, establish environmental performance standards, and require recharging of aquifers. Intergovernmental compacts should be developed to ensure complete protection of aquifers which cross municipal boundaries. (Examples: Barnes Aquifer Protection Advisory Committee and compact in Easthampton, Holyoke, Westfield and Southampton, MA)

- Prevent pollution to rivers and lakes by requiring non-point source pollution best management practices, such as no-cut vegetated buffers along water bodies, erosion and sedimentation controls, and on-site stormwater recharge.

- Prevent new construction in environmentally sensitive areas by adopting overlay zoning districts for floodplains, steep slopes and ridgelines in order to minimize flooding, control erosion and sedimentation, and prevent degradation of scenic areas. (Example: Monson, MA)

- Create urban stormwater runoff bylaws, promoting measures to recreate natural filtration processes, such as constructed wetlands, drainage swales, and extended time detention basins. Require that impervious surfaces are minimized and on-site infiltration is maximized. (Example: Holyoke, MA)

- Adopt municipal policies for correction of combined sewer overflows. Seek innovative CSO correction strategies and funding sources.

10. Control Commercial Strip Development

- Change zoning along major highway corridors to prevent commercial strips from developing, and encourage clustering of new commercial development in nodes. Minimize automobile dependency by creating new commercial centers that are transit-friendly and accessible to pedestrians, bicyclists and transit.

- Replace highway business zoning districts that extend along the entire length of highways and create multiple zoning districts for specific purposes. For example, districts can include a limited business district; historic village center business district, planned business village district, multi-family residential district, auto mall district and light industrial research park district. Most retail uses should be clustered in compact, pedestrian-friendly nodes or centers. Land along the highway between centers should be converted over time from auto-dependent; strip retail uses to apartments, condominiums and office buildings - uses generating fewer auto trips than shopping.

- Create a building streetline along arterials, by establishing zoning for maximum setbacks, parking in the rear of buildings, sidewalks and street trees in the front of buildings. A streetline creates a more aesthetically pleasing walking experience, and moving buildings up to the street improves pedestrian access.

- Focus new, large-scale development along highways in planned business villages with on-site housing and pedestrian-friendly site plans.

- Establish commercial development performance standards for all highway business uses, including "big box" retailers. Create standards for landscaping, screening, signage, curb cuts, parking, pedestrian and transit access, architectural design, lighting and environmental impacts. Discourage drive-in services.

- Provide density bonuses for shared parking areas and common driveways. (Examples: Hadley, Granby and Northampton, MA; Fort Collins, CO)

- Establish traffic management bylaws, including requirements for trip reduction plans and traffic impact statements for large-scale developments. (Example: Hadley, MA)

- Adopt regulations to require businesses to include sidewalks, internal pedestrian circulation systems and stronger pedestrian connections to adjacent areas. Locate transit stops immediately adjacent to shopping and work entrances with covered waiting areas.

- Establish limited access highways, where appropriate, through designation by Massachusetts Highway Department. Other deterrents for strip arterial shops could include a ban on curb cuts, the creation of medians, or zoning changes to encourage apartment and office developments over retail.

- Create boulevards, with a planted median, by redesigning sections of arterial. Create a wide sidewalk shared by pedestrians and bicyclists, and angled on-street parking.

11. Improve Infrastructure in Urban Areas and Limit Infrastructure Expansions

- In urban areas, target public funds for improvement and upgrading of infrastructure, such as sewer and water facilities, streets and roads, to promote private reinvestment. In rural areas, limit infrastructure expansions to prevent urban sprawl. The availability and adequate capacity of infrastructure is a key factor guiding the timing and location of new development.

- Establish policies limiting extension of sewer and water lines beyond designated growth areas.

- Seek targeted state and federal funding for improvement of urban infrastructure, such as correction of combined sewer overflows, water treatment facilities, road improvements, schools, police and fire protection, parks and recreation, burial of power lines and others.

F. ENVIRONMENTAL IMPROVEMENT STRATEGIES

The Pioneer Valley Region must also address the need for environmental improvements associated with existing and proposed transportation systems. Actions targeted at preventing or mitigating potential negative environmental impacts should accompany the efforts toward improving the transportation system. The ISTEA legislation identifies this concern by providing funding sources such as the STP enhancement set-aside, the Scenic Byways Program and the National Recreational Trails Funding Program.

Examples of environmental improvement projects which may be eligible for federal funding include: mitigation of water pollution due to stormwater runoff; landscaping and aesthetic improvements; acquisition of scenic and historic sites along transportation corridors; scenic or historic highway programs; bicycle and pedestrian facilities; archaeological planning and research; preservation of abandoned rail corridors; control and removal of outdoor advertising; historic preservation and rehabilitation of historic transportation facilities. These activities may be eligible exclusively or in conjunction with highway projects.

Several proposed actions are outlined below which address the various areas on environmental concerns.

1. Water Quality Goals

The Pioneer Valley region should employ "Best Management Practices" (BMPs) to prevent and reduce urban runoff from highways and streets and mitigate its impacts to surface and groundwater drinking water supplies, rivers, lakes and streams. BMPs should be incorporated into the design and construction of all transportation projects, including redevelopment projects, to mitigate impacts to water resources. Project proponents should be strongly encouraged to capitalize on opportunities to retrofit existing BMPs to increase removal rates of pollutants such as total suspended solids (TSS), fertilizers, and heavy metals, common contaminants found in highway run-off. Existing BMPs can be upgraded in several ways, including constructing artificial wetlands, and enhancing existing retention and detention areas with forebays to collect sediment for easy removal. A comprehensive inventory of needed urban runoff control projects should be undertaken in order to prioritize projects for future funding.

Combined sewer overflows adversely affect water quality in the Connecticut River and is a primary concern to the region. In older urban municipalities, such as Springfield, Chicopee, Holyoke, Agawam, West Springfield, Ludlow, South Hadley, and Palmer, combined sewer systems need to be replaced with separate sewer systems. Sewer separation is an expensive and time consumptive process, because it usually requires excavating and repaving streets. Road and street repair and reconstruction projects provide valuable opportunities to reduce the costs associated with sewer separation projects.

Reduced roadsalting programs have been successfully implemented on state highways in Goshen, Cummington, Granby, Belchertown, Easthampton, and Pelham to mitigate salt contamination of sensitive water supplies. Under reduced roadsalt programs, winter highway salt application rates are decreased by as much as two-thirds, and alternative maintenance practices, such as salt substitutes, pavement additives, increased sanding and plowing, and public education are employed. There are many other public and private water supply areas which are crossed by state highways or other major roads, and could benefit from reduced roadsalting policies. A comprehensive program should be undertaken to study the region's water resources (reservoirs, aquifer recharge areas and public and private wells), the watersheds, and transportation infrastructure (highways and roads). Sensitive areas should be identified, and reduced road sand and salt programs and additional mitigation measures should be initiated and implemented in these areas.

2. Air Quality Goals

The most successful strategies for reducing emissions are lowering the level of pollution emitted by individual vehicles through improved technology, reducing traffic congestion by improving intersection levels of service; and lowering overall vehicle use through a reduction in vehicle miles traveled (VMT) and the number of trips. Reducing engine emissions is highly dependent on research of reformulated gasolines, improved exhaust filters and scrubbers, increased vehicles inspection regulations and experiments with alternate fuels such as compressed natural gas and electric vehicles. Maximizing the efficiency of intersections is strictly a traffic engineering problem, and is accomplished through signal coordination and timing. The Clean Air Act and ISTEA, however, promote the use of both "supply-side" and "demand-side" strategies to achieve reductions in vehicle use. The RTP previously addressed supply-side strategies such as travel demand management, traffic control measures and alternate modes. The primary demand-side strategy for reduced emissions is through land use regulations.

Land use regulations and zoning bylaws that encourage mixed-use and high-density forms of development reduce low density sprawl and provide a balance of both jobs and housing in close proximity. Impact fee ordinances for new development can be employed by municipalities and can be used to provide transit, pedestrian and bicycle facilities for the community. Trip reduction zoning can

be used to ensure that each new development project considers and includes alternatives to single occupancy vehicle access.

G. LONG RANGE PROJECTS

1. 2010 Projects

a) Widening and Reconstruction of the Great River Bridge in Westfield

The Great River Bridge spans the Westfield River in Westfield and is part of Route 10/202. This bridge serves as the main corridor to the Massachusetts Turnpike and points north of the city. The Pioneer Valley CMS has identified the segment of 10/202 through Westfield, from the Route 20 exchange to the Massachusetts Turnpike entrance, as one of the congested corridors in this area. This corridor currently has one travel lane in each direction, on street parking for local business and heavy traffic volumes accessing 10/202 from side streets. Traffic can queue and fill this 0.5 mile long roadway in both directions while drivers often wait two traffic signal cycles to gain access to the Great River Bridge. Traveling south on 10/202 vehicles may queue through two traffic lights blocking access to 10/202 from Montgomery and Union Street which serves many residential communities in Westfield and also serves as the main route to Westfield High School.

The project will include reconstruction and widening of the existing bridge, with the addition of a sister span along the east side of the existing bridge. The existing bridge will contain three one-way southbound travel lanes and the sister span will contain three one-way northbound travel lanes. Redesign of the roadways north of the bridge is also included in the project. Two additional lanes will be added to Route 10/202 from the intersection of Route 10/202 with Montgomery Street. These three lanes will be one-way traveling south to the bridge. The existing portion of Union Street from the Great River Bridge to the intersection of Route 10/202 will also contain three northbound one way lanes. Signals located at the intersection of Route 10/202 with Montgomery and Union Streets will also redesigned to allow access to both Montgomery and Union Streets setting up a rotary effect. Signal coordination is also expected along the Route 10/202 corridor, from the bridge to the Massachusetts Turnpike Entrance.

The project is expected to improve traffic flow throughout this corridor. By increasing the travel lanes for each approach to the bridge, traffic queues should be reduced thereby reducing congestion throughout the downtown area. Travel time should also decrease due to a reduction in congestion and the increase in travel speed. The redesign of the intersections north of the bridge should also allow easier access to Union Street and Montgomery Ave.

Projected traffic volume increased along the bridge by 34-39%. Volume increased as a direct result of decreased congested travel time. Travel time along the entire corridor from Franklin Avenue to the entrance of the Massachusetts Turnpike, decreased by 33-41% relative to the 2003 base model network projected travel time. Travel speed increased along the entire corridor by approximately 55-71%. The 2010 projected traffic volume along the Greater Westfield Bridge was 23,759 vehicles Southbound, while the Sister span traveling northbound had a projected volume of 24,640 vehicles. With the addition of the Sister span, travel speed along the Greater Westfield Bridge and the Sister span increased by approximately 76%. The model did show a decrease in travel speed by 50% southbound from the Greater Westfield Bridge to Franklin Ave.

b) Blunt Park Connector, Springfield

The Blunt Park connector project involves the construction of a new roadway connecting Roosevelt Avenue with Bay Street Springfield. Currently vehicles traveling from North from

Roosevelt Avenue must drive around Blunt Park to connect with Bay Road. Bay Road intersects with Tapley Street, which serves as a main connection with I-291.

This project should alleviate traffic congestion at the Roosevelt Avenue/Bay Road intersection. Vehicles traveling in the direction of I-291 would no longer be required to navigate around Blunt Park. Both Bay Road and Roosevelt Avenue average 11,873 and 10,554 vehicles per day respectively. Volumes are expected to decrease on these roads, with traffic following a shorter path.

The model projected an average volume of 8103 vehicles per day on the Blunt Park Connector Road. Traffic volumes decreased along Bay Road by 19% north of the intersection of the Blunt Park Connector. Traffic volumes increased south of the intersection with Bay Road by 37% between Blunt Park and Tapley Street. Roosevelt traffic volumes also decreased 31% north of the intersection with Blunt Park Connector and increased 44% south of the intersection. It is evident that the Blunt Park Connector does encourage traffic volume. Tapley Street traffic volumes increased by approximately 24%. Travel speed decreased on Tapley Street traveling west by 30% indicating increased traffic flow from Bay Road to Tapley Street.

c) Maple Street Bridge Improvements, Chester

The Maple Street Bridge is located in the western section of the Town of Chester and spans the western branch of the Westfield River. This bridge provides access from Route 20 to Main Street and was closed to vehicular traffic in 1981. As currently proposed, the bridge would be restored as a pedestrian/bicycle facility providing one lane of traffic in the northbound direction.

This project is expected to provide access from Route 20 to downtown Chester via Maple Street without increasing traffic flow along Main Street. The projected traffic volume along the Maple Street Bridge is 609 vehicles per day.

d) Additional Ramp from 291 to West Columbus Ave, Springfield

In order to access the Memorial Bridge from Interstate 291 westbound, vehicles must perform a weave across three lanes of traffic on Interstate 91 southbound in a span of a few hundred feet.

This is a dangerous movement and causes a safety hazard at this location. In order to improve the access to the Memorial Bridge from Interstate 291, the proposed alternative is to add an additional ramp from Interstate 291 westbound to connect directly with Exit 7 of I-91 allowing direct access from I-291 to West Columbus Avenue and subsequently the Memorial Bridge.

The new ramp is expected to reduce traffic flow along the existing I-291 ramp and the I-91 Exit 7 ramp as a result of vehicles choosing the shortest path to the Memorial Bridge. This direct path from I-291 to the Memorial Bridge should alleviate any safety hazards and congestion along I-91 due to weaving across the three lanes of traffic. In addition a decrease in traffic flow is expected along I-91 between the existing I-291 Ramp and Exit 7, which provides access to the Memorial Bridge. The I-91 Exit 7 ramp is further expected to decrease flow as vehicles will be utilizing the direct exit.

The addition of a dedicated ramp from I-291, which will provide access directly to the Memorial Bridge, reduced traffic flows along the existing I-291 ramp, I-91 and Exit 7 of I-91. The new ramp is projected to have an average traffic flow of approximately 10,492 vehicles. Traffic along the existing I-291 ramp and the I-91 segment between the existing ramp and Exit 7, is expected to decrease by 11-19%. In addition the I-91 Exit 7 ramp providing access to the Memorial Bridge from I-91 had a projected decrease in traffic flow by 54%.

e) Parker Street, Springfield Reconstruction and Widening

Parker Street, Springfield connects Boston Road with Main Street, Ludlow and serves as a connection to Oak Street and Verge Road. Oak Street is a well traveled roadway serving both residential and through traffic to Route 20 while Verge Road accesses a retail shopping center.

This heavily traveled corridor currently has one travel lane in each direction from the Parker Street/Boston Road intersection through to Main Street, Ludlow. The proposed improvements would increase the lanes to two travel lanes in each direction from Boston Road to Oak Street, providing turning lanes at the intersection of Oak and Verge Streets, and the coordination of signals along the entire corridor.

The additional lane along Parker Street from Boston Road to Oak Street decreased travel time by approximately 8% through this corridor. The decrease in congestion also increased the travel speed by 9-10% in both directions. North of Oak Street, along Parker, showed relatively small differences. Traffic volume increased by 3% while time increased by 2% as well as travel speed decreased by 4%. Volume did increase along Oak Street by approximately 13% directly responding to increased traffic volumes along the well traveled segment of Parker Street from Boston Road to Oak Street.

f) Damon Road, Northampton Widening and Resurfacing

Damon Road in Northampton connects traffic from Route 9 to Kings Highway. The Kings Highway intersection with Damon Road serves as access to traffic from downtown Northampton to points north of the city, retail uses along Kings Highway and residential neighborhoods to the west. Traffic queues with significant delays occur in all directions. At the I–91/Route 9 interchange with Damon Road recent improvements include the construction of additional exclusive turn lanes and upgrades to the existing traffic signals.

Widening and resurfacing of Damon Road would also include additional dedicated turning lanes along the roadway and at the intersection with Kings Highway. The signal at this interchange would be re-timed to reduce congestion at this signal.

The model shows a projected traffic volume of 22,469 for the year 2010, along Damon Road reflecting a 33% increase. However, even with the additional traffic volumes, there is a reduction in travel time along the road by approximately 12% in the southbound direction. The decrease in travel time is influenced by the increase in travel speed by 13%. On the contrary northbound along this corridor experienced increased travel time by 3% which resulted in travel speeds decreasing only 3% as well. This project should aid in reducing congestion along Damon Road by reducing travel time in the southbound direction, the additional lanes at the Kings Highway interchange should also aid in reducing congestion at this interchange.

2. 2020 Projects

a) Relocation of Route 57 in Agawam and Southwick

Route 57 currently runs from the South End Bridge in Springfield to the west, providing access to and from Springfield for many southwestern communities. The roadway is a limited access highway from the Route 5/57 rotary to its interchange with Route 187 in Agawam. This heavily traveled corridor has recently experienced economic growth. Residential and retail development has continually increased along this corridor thereby increasing congestion.

The relocation project of Route 57 in Agawam and Southwick is to be implemented in two phases. The first phase included the relocation of Route 57 from Mill Street to Route 187 (South Westfield Street) and was completed in 1996. The second phase includes the extension of the new Route 57 from Route 187, west to the Agawam/Southwick line reconnecting to the original roadway. Phase two of the proposed project is intended to reduce traffic volume along the original Route 57 and Route 187. These streets presently serve as the main connections to routes extending both north and west from the Phase One completed portion of the project.

The Phase Two portion of the project has a projected average traffic volume of 11,164 vehicles with an average congested travel speed of 55 mph. Traffic volumes along the existing original portion of Route 57 decrease by 78%. Additionally, Route 187 from the interchange of Route 57 to the interchange with North Westfield Street and the original Route 57 experienced a 41% decrease in projected traffic volume an a 18% increase in travel speed.

Projected traffic volumes along the Phase One portion of Route 57 increased over 100% as a result of the project. This may be due to additional changes in the 2020 network including the reconstruction of the South End Bridge in Springfield. The projected traffic flow improvements in this area confirm that Phase Two of the Route 57 project is an important improvement to the regional transportation system.

b) Relocation and reconstruction of South End Bridge, Springfield

The South End Bridge in Springfield serves as the fundamental link between Route 5, Route 57 and I-91. The traffic along these main corridors has increased dramatically causing congestion along the bridge and highway. A Study for this area commissioned by MassHighway recommends construction of a new bridge located south of the existing bridge and removal of the Route 5/57 rotary and existing bridge. The new bridge is proposed to have two travel lanes in each direction with a ramp system providing connections to I-91, Route 5 and Route 57. Improvements would also be made to I-91 northbound to correct an existing lane reduction from three to two lanes. Under the proposed improvement alternative, three northbound travel lanes would be maintained on I-91.

The projected traffic volume for the new South End Bridge is approximately 70,215 vehicles. This represents a 17% increase relative to volumes on the existing South End Bridge. In addition, travel time in the east direction was decreased by 6% and travel speeds increased by 6%.

Traffic volumes increased along Route 5 and Route 57 by 44% and 69% respectively, while traffic volumes decreased along I-91 between Exit 2 and Exit 49, by approximately 37%. This is mainly due to the relocation of the bridge further to the south on I-91. Projected travel times in this area decreased by 8%, while travel speed increased 7%. The model clearly shows that the restructuring of the on and off ramp system located along this corridor increases travel speeds and decreases travel time while reducing weaving.

c) Elmwood Bypass, Holyoke

Interstate 391 currently ends at High Street just north of the downtown Holyoke area. As a result, traffic congestion occurs through this neighborhood from northbound vehicles destined to Route 5 and the Holyoke Mall. A direct link between I-391 and Route 5 would alleviate traffic congestion throughout this area, while improving traffic conditions through these local residential neighborhoods.

The new roadway is proposed directly link Route 5 to I-391. The Elmwood Bypass would follow the right-of-way parallel to the west of the existing Pioneer Valley Railroad and connect to Route 5, (Northampton Street) just south of Whiting Farms Road.

Projected traffic volumes along the Elmwood Bypass is 10,187 vehicles. Traffic volumes along South Street and Laurel Street both experienced significant decreases in traffic. The model shows this project should reduce congestion on local streets while providing vehicles a direct connection to points north of I-391.

3. 2025 Projects

a) Route 66 Connector, Northampton

The Route 66 project entails the construction of a new road connecting Old South Street and Route 66. It will allow traffic to access Route 66 while bypassing the intersection of Routes 9 and 10, which is the busiest intersection in Downtown Northampton.

b) Route 21 Bridge Reconstruction and Widening, Ludlow

This bridge is part of Route 21 spanning the Chicopee River between Springfield and Ludlow. Reconstruction and widening of the bridge would relieve traffic congestion along this heavily traveled corridor.

c) East Longmeadow Rotary Signal Coordination and Rotary Improvements

The East Longmeadow Rotary is a seven-legged rotary merging three heavily traveled routes with four local roads. The proposed recommendation to alleviate congestion at this time is signal coordination with dedicated turn lanes for all entering routes.

4. Non-motorized Transportation Projects

A number of off-road and on-road projects were identified and an implementation schedule has been developed within the Non-motorized Transportation Plan. The short range projects (between 2 to 12 years) that focus on off-road facility improvements include the: Norwottuck Easterly Extension, the Belchertown Rail Trail, the Norwottuck Westerly Extension, the Willamsburg extension of the Northampton Bikeway, Manhan Rail Trail Project in Easthampton, the Chicopee Riverwalk and Bikeway Project and the Southwick Rail Trail. The short range on-road projects include the: UMass to Norwottuck Connector via University Drive, the region-wide improvement of bicycle parking facilities, the State Street/Wilbraham Road bicycle lanes in Springfield, the Route 5 Northampton to Holyoke roadway improvement project, the Holyoke east-west signed bicycle route, and the Westfield Route 10/202 bikeway.

The off-road, long range priorities (to be implemented in the next 8 to 20 years) includes the Ludlow Bikeway project, the Connecticut Riverwalk and Bikeway project as it has been planned to eventually extend the entire length of the river from the Connecticut state line through to the Norwottuck Rail Trail in Hadley and Northampton, and the Hazardville Rail Trail. The long range on-road projects include the Route 116/141 Holyoke-Chicopee bridge improvement, the Route 5 Holyoke to Springfield road improvement, the Route 5/57 Agawam/Springfield bridge improvement and redesign, the Northwest Road in Westfield road improvement project, the Route 9 Belchertown road improvement project, the Route 32 Palmer/Ware roadway improvement project, and the East and Southeast Springfield roadway improvement project.

5. Transit Improvement Projects

a) Farebox Upgrade

An upgrade in farebox technology would have a significant effect on the PVTA. In the Long Range Element, because of the large investment needed to facilitate the upgrade, technologically advanced fareboxes could play an instrumental role in increasing ridership and automating transit data collection.

New Fareboxes will increase ridership by making buses more convenient. Correct change would no longer be necessary for potential riders since new fareboxes are capable of producing change.

As smart card technology continues to advance, the farebox system could automate transit data collection. The data collected, which was surveyed manually in the past, would be highly accurate. Furthermore, the smart card system could be utilized to obtain even more detailed ridership information just by encoding the cards with demographic and socioeconomic information. With the increase in information, better routing and operation will result.

b) Fleet Improvement Schedule

The average lifespan of a bus is 12-17 years; therefore, every vehicle in the fleet will need replacement at least once before the year 2025. The lifespan of a bus could easily shorten due to increasing regulations on emissions and accessibility, because it may not be feasible to retrofit a bus with satisfactory improvements.

CHAPTER 11

FINANCIAL ELEMENT

Title 23 CFR Section 450.324 and 310 CMR 60.03(9) require the RTP to be financially constrained by year. The financial element must demonstrate which projects can be implemented using current revenue sources and which are to be implemented using proposed revenue sources, while the existing transportation system is being adequately operated and maintained. Projects can only be programmed up to the congressionally authorized spending amounts in any individual fiscal year.

A. REVENUE

The overall RTP, and each fiscal year contained herein, is financially constrained to the annual federal apportionment and projections of state resources reasonably expected to be available during the appropriate time-frame. Projections of federal resources are based upon the estimated apportionment of the federal authorizations contained in TEA-21, as allocated to the region by the state or as allocated among the various MPOs according to federal formulae or MPO agreement. Projections of state resources are based upon the allocations contained in the current Transportation Bond Bill.

MassHighway provided the estimate of available highway side revenue for this update. Additional funding for highways has been earmarked by TEA-21 and the latest Massachusetts Transportation Bond Bill. The transit funding sources, including farebox, local, state and federal were averaged over the last five-year period and aggregated through the life of the RTP. The region is also expecting approximately $30 million in Section 5309 Discretionary funds from a Congressional earmark. These funds will be used for the rehabilitation of Union Station in Springfield.

B. EXPENDITURES

1. Regionally Significant Expenditures

Significant Capital Expenditures include projects estimated to equal or exceed $10,000,000 and any projects, other than maintenance and operating, expected to be funded and are included in the air quality conformity analysis.

The costs of the projects identified reflect generic project cost estimates provided by the Commonwealth and/or the most recent Transportation Improvement Program. Projects analyzed as a part of the development of the RTP, but not recommended for action are not included in the expenditure estimates.

2. Operating and Maintenance

A review of the past Transportation Improvement Programs was conducted to estimate the annual programmed funds for system operating and maintenance activities for all transportation modes. Transit fleet and capital improvement estimates are based on average equipment lifespan.

The following assumptions should be noted:

- Annual estimates do not take into account inflation.

- Off-TIP project funding has been included in the financial element.

The necessary information to complete the Financial section of the Pioneer Valley RTP was not available at the time of this publication. The complete financial section will be posted on the RTP website: www.pvpc-rtp.org *as soon as it becomes available. This information can also be requested directly from PVPC.*

CHAPTER 12

CONFORMITY

A. INTRODUCTION

This document presents information and analyses for the latest air quality conformity determination for the 2000 Regional Transportation Plan of the Pioneer Valley MPO, as required by Federal Regulations 40 CFR Part 93, and the Massachusetts Conformity Regulations (310 CMR 60.03). This information and analyses include: regulatory framework, conformity requirements, planning assumptions, mobile source emissions budgets, and conformity consultation procedures.

1. Legislative Background

Western Massachusetts has been classified as a serious nonattainment area for ozone and is in nonattainment for carbon monoxide (CO) in Springfield. With this nonattainment classification, the 1990 Clean Air Act Amendments (CAAA) require the Commonwealth to reduce its emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx), the two major precursors to ozone formation, to achieve attainment of the ozone standard by 1999. The City of Springfield must also reduce its emissions of carbon monoxide.

The CAAA and the Commonwealth acknowledge that mobile sources are among the major sources of emissions of VOCs, NOx and CO. Prior to the 1990 amendments, the majority of pollution control measures focused on stationary industrial sources. The Massachusetts 1993 Emissions Inventory indicates that on-road mobile sources emit approximately 28% of the total VOCs, 43% of the total NOx and 56% of the total CO emissions (summer day) in the state. Mobile source CO emissions on a winter day are approximately 78% of the total statewide CO emissions.

The Commonwealth revised its State Implementation Plan (SIP) which was submitted to the United States Environmental Protection Agency (EPA) on November 15, 1993. This SIP revision is a strategy of programs to show Reasonable Further Progress of a 15% reduction of VOCs in 1996 toward attainment of the National Ambient Air Quality Standards (NAAQS) for ozone in 1999. A large number of the programs target mobile sources, including an enhanced inspection and maintenance program, reformulated gasoline, and California Low Emissions Vehicle Program. It also included a VOC mobile source emission budget for 1996.

A second major revision to the SIP was submitted to EPA in December 1994. This submission included programs to provide a further reduction of 9% in NOx emissions. NOx reduction credits will be taken from stationary sources through NOx Reasonably Available Control Technology (RACT), and from mobile sources through the Enhanced Inspection and Maintenance Program, the California Low Emission Vehicle Program, and the Tier I Federal Vehicle Standards. A NOx emission budget for 1999 and each year thereafter and a VOC emission budget for 1999 and each year thereafter was included in this submission. In addition, the 1996 VOC budget was revised.

In March of 1997, DEP submitted a 1996 Rate of Progress Report describing the progress to date on the SIP commitments that were submitted to EPA in 1993 and 1994. At that time they had the opportunity to make any revisions and corrections to programs that were submitted to ensure that the ozone air quality standards will be achieved by 1999. As part of the 1996 Progress Report, DEP revised the mobile source emission budget. Previously, the mobile source budget was developed using the Highway Performance Monitoring System which uses traffic count data from spot locations along

different functional classes of roadway to determine vehicle miles of travel in the region. The new mobile source emission budget was calculated using transportation demand models maintained by the regional planning agencies. In addition, some inputs to the emissions model were changed. They will be detailed in later sections of this conformity determination.

On October 1, 1998, DEP submitted to EPA a technical correction to the Massachusetts SIP for Ozone, which included a 2003 mobile source emission budget. EPA found this budget adequate for conformity purposes on February 19, 1999. This budget supplemented the July 27, 1998 submittal of the Commonwealth's Ozone Attainment Demonstration Plan (a control strategy SIP). In this situation, regulations require that conformity be re-determined for transportation plans and TIPs within 18 months of the submittal of the control strategy SIP (July 27, 1998).

2. Conformity Regulations

The CAAA revised the requirements for designated Metropolitan Planning Organizations (MPOs) to perform conformity determinations by ozone non-attainment area for their Transportation Plans and Transportation Improvement Programs (TIPs). Section 176 of the CAAA defines conformity to a State Implementation Plan to mean conformity to the plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of the standards. The Pioneer Valley MPO must certify that all activities outlined in the **2000 Pioneer Valley Regional Transportation Plan**:

- will not cause or contribute to any new violation of any standard in any area;
- will not increase the frequency or severity of any existing violation of any standard in any area; and
- will not delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The EPA issued final conformity regulations in the November 24, 1993 Federal Register and Massachusetts DEP issued new conformity regulations effective December 30, 1994. They set forth requirements for determining conformity of Transportation Plans, Transportation Improvement Programs, and individual projects. The federal conformity regulations were amended on August 15, 1997. The requirements of the conformity analysis are summarized below and will be explained in detail in this conformity determination:

a) Conformity Criteria

- Horizon Years
- Latest planning assumptions
- Latest emission model used
- Timely implementation of transportation control measures (TCMs)
- Conformity in accordance with the consultation procedures and SIP revisions
- Public Participation Procedures
- Financially Constrained Document

b) Procedures for Determining Regional Transportation Emissions

(i) The Conformity Test

- Consistent with emission budgets set forth in SIP
- Contribute to reductions in CO nonattainment areas

In addition, the regulations set specific requirements for different time periods depending on the timeframe of the Commonwealth's SIP submittals to EPA. These periods are defined below:

Control Strategy Period: Once a control strategy SIP has been submitted to EPA, EPA has to make a positive adequacy determination of the mobile source emission budget before such budget can be used for conformity purposes. The conformity test in this period is consistency with the mobile source emission budget.

Maintenance Period is the period of time beginning when the Commonwealth submits and EPA approves a request for redesignation to an attainment area, and lasting for 20 years. The conformity test in this period is consistency with the mobile source emission budget.

The baseline vs. action test, and the "less than 1990" emission test were required under the November 1993 conformity regulations. The 1997 Conformity Amendments have eliminated the emission reduction test once a Control Strategy SIP's mobile source emission budget has been deemed adequate by EPA. Conformity of this amendment will be showing consistency with the mobile source emission budget in the Western Massachusetts ozone nonattainment area and in the Springfield CO nonattainment area. The baseline vs. action test or the less than 1990 emissions test is required in the City of Springfield CO nonattainment area because there has been no budget set for that area.

B. CONFORMITY DETERMINATION CRITERIA

This conformity determination has been prepared in accordance with 40 CFR Part 93 - Transportation Conformity Rule Amendments: Flexibility and Streamlining; Final Rule. It shows that the **2000 Pioneer Valley Regional Transportation Plan** has been prepared following all the guidelines and requirements of the rule.

1. Horizon Year Requirements

Horizon years for regional model analysis have been established following 40 CFR 93.106(a) of the Federal Conformity Regulations. The years for which the model was run are shown below.

- 1997 - Milestone Year - This year has been established as the base year in the SIP for calculation of emission reductions of VOCs, NOx and CO
- 2003 - Milestone Year – Attainment year
- 2010 - Analysis Year
- 2020 - Analysis Year
- 2025 - Analysis Year – last forecast year of transportation plan

2. Latest Planning Assumptions

a) Population, Employment and Traffic Assumptions

Section 93.110 of the Federal Conformity Regulations outlines the requirements for the most recent planning assumptions that must be in place at the time of the conformity determination. Assumptions must be derived from the estimates of current and future population, employment, travel, and congestion most recently developed by the MPO. Analyses for the **2000 Pioneer Valley Regional Transportation Plan** are based on U.S. Census data and information obtained from the Pioneer Valley Planning Commission and Massachusetts Highway Department. The following is a list of the sources of data used for the **2000 Pioneer Valley Regional Transportation Plan** analysis:

- **Households:** Massachusetts Institute for Social and Economic Research (MISER) data.
- **Employment:** Town-level employment from Massachusetts Department of Employment and Training (DET) using the 1997 Minor Civil Divisions data. Traffic analysis zone apportions based on the ratio of a Block group's 1990 employment to total 1990 Minor Civil Division employment reported in the Census Transportation Planning Package.
- **Employment Forecasts:** Provided by the Pioneer Valley Planning Commission (PVPC), Regional Data Center, 2000.
- **Household Forecasts: PVPC**, Regional Data Center, 2000.
- **Vehicle Ownership:** Summary Tape File 3 data from the 1990 U.S. Census of Population and Housing.
- **Traffic Volumes:** PVPC, "Regional Traffic Counts 1995-1999", April, 2000, "Regional Traffic Counts 1992 – 1997", March, 1998, "A Decade of Regional Traffic Counts 1982-1992", December 1992. (This report includes counts from the Massachusetts Highway Department. Additional traffic counts were conducted by the Pioneer Valley Planning Commission staff.
- **Project-Level Data:** Obtained from the responsible implementing agency.

b) Transit Operating Policy Assumptions

The operating policies and assumed transit ridership have not changed significantly since the conformity determination prepared for the original 1997 Transportation Plan and its 1998 amendment.

c) Emission Inventory Assumptions

The VOC mobile source emission budget for 2003 for the Massachusetts Western Nonattainment Area has been set at 23.770 tons per summer day and the 2003 mobile source budget for NOx is 49.110 tons per summer day.

The Pioneer Valley MPO VOC and NOx emissions will be combined with the following MPOs/RPAs to show conformity with the SIP in the Western Massachusetts Ozone Nonattainment Area:

- Berkshire Region MPO

- Franklin Regional Council of Governments*

* This region does not contain any urbanized areas, but is considered to be a MPO for planning purposes.

The Massachusetts Highway Department (MassHighway), on behalf of the Executive Office of Transportation and Construction (EOTC), compiled the results from all the MPOs in the Western Massachusetts ozone nonattainment area. The air quality analysis has been finalized for all of the MPOs and the EOTC has made the final conformity determinations for the ozone nonattainment area.

d) Latest Emission Model

Emission factors used for calculating emission changes were determined using MOBILE 5A-H, the model used by DEP in determining the mobile source budget. Emission factors for motor vehicles are specific to each model year, pollutant type, temperature and travel speed. MOBILE 5A-H requires a wide range of input parameters including inspection and maintenance program information and other data such as anti-tampering rates, hot/cold start mix, emission failure rates, vehicle fleet mix, fleet age distribution, etc.

The input variables used in this conformity determination were received from DEP. The inputs used for the 1990 base case existing network were the same as those used in determining the 1990 Emissions Inventory for the Commonwealth of Massachusetts. The inputs used for the years 1999 through 2020 were also received from DEP and include information on programs that were submitted to EPA in 1993, 1994, 1997, 1998 and 1999 as the control strategy for the Commonwealth to obtain ambient air quality standards for 1999.

e) Timely Implementation of Transportation Control Measures

Transportation Control Measures (TCMs) have been required in the SIP in revisions submitted to EPA in 1979, and 1982 and those submitted as mitigation for the construction of the Central Artery project. Those SIP TCMs included in the 1979 and 1982 submission for implementation in the Pioneer Valley Region have all been accomplished through construction or through implementation of ongoing programs. These projects have all been included past Pioneer Valley MPO Transportation Plans and TIPs.

DEP has submitted their strategy of programs to show Reasonable Further Progress of a 15% reduction of VOCs in 1996 and the further 9% reduction of NOx toward attainment of the National Ambient Air Quality Standards (NAAQS) for ozone in 1999 to EPA. Within that strategy, there are no specific TCM projects. They do call for traffic flow improvements to reduce congestion and, therefore, improve air quality. Other transportation-related projects that have been included in the SIP control strategy are listed below:

- Enhanced Inspection and Maintenance Program
- California Low Emission Vehicle Program
- Reformulated Gasoline for On and Off-Road Vehicles
- Stage II Vapor Recovery at Gasoline Refueling Stations
- Tier I Federal Vehicle Standards

f) Consultation Procedures

The final conformity regulations require that the MPO must make a conformity determination according to consultation procedures set out in the federal and state regulations and it must also follow public involvement procedures established by the MPO under federal metropolitan transportation planning regulations.

The consultation requirements of both the state and federal regulations require that the Pioneer Valley MPO, EOTC/MassHighway, Mass. DEP, EPA - Region 1 and FHWA - Region 1 consult on the following issues:

- Selection of regional emissions analysis models including model development and assessing project design factors for modeling.
- Selection of inputs to the most recent EPA-approved emissions factor model.
- Selection of CO hotspot modeling procedures, as necessary.
- Identification of regionally significant projects to be included in the regional emissions analysis.
- Identification of projects which have changed in design and scope.
- Identification of exempt projects.
- Identification of exempt projects that should be treated as non-exempt because of adverse air quality impacts.
- Identification of the latest planning assumptions and determination of consistency with SIP assumptions.

These issues have all been addressed through consultation of the agencies listed above.

g) Public Participation Procedures

Title 23 CFR Section 450.324 and 40 CFR 90.105(e) require that the development of the Plan, TIP, and related certification documents provide an adequate opportunity for public review and comment.

Section 450.316(b) establishes the outline for MPO public participation programs. The Pioneer Valley MPO developed a Public Participation Process that provides complete information, timely public notice, full public access to key decisions, and opportunities for early and continuing involvement. The development and adoption of this program conforms to the requirements of the section. It guarantees public access to the RTP and all supporting documentation, provides for public notification of the availability of the RTP and the public's right to review the document and comment thereon, and provides a 30-day public review and comment period prior to the adoption of the RTP and related certification documents by the MPO.

On November 1, 2000, public notices were advertised in the Springfield Union News and Daily Hampshire Gazette informing the public of its right to comment on the document. On XXXXXX, the Pioneer Valley Joint Transportation Committee recommended that the MPO endorse the RTP and conformity determination as amended. Consequently, on , the Pioneer Valley MPO voted to approve the 2000 RTP and its conformity determination. This allowed ample opportunity

for public comment and MPO review of the draft document. These procedures comply with the associated federal requirements.

h) Financial Consistency

Title 23 CFR Section 450.324 and 40 CFR 93.108 require the 2000 Pioneer Valley Regional Transportation Plan, as amended, to "be financially constrained by year and include a financial plan that demonstrates which projects can be implemented using current revenue sources and which projects are to be implemented using proposed revenue sources."

The **2000 Pioneer Valley Regional Transportation Plan** and its latest conformity determination is financially constrained to projections of federal and state resources reasonably expected to be available during the appropriate time-frame. Projections of federal resources are based upon the estimated apportionment of the federal authorizations contained in TEA-21, as allocated to the region by the state or as allocated among the various MPOs according to federal formulae or MPO agreement. Projections of state resources are based upon the allocations contained in the current Transportation Bond Bill and historic trends. Therefore, the **2000 Pioneer Valley Regional Transportation Plan** substantially complies with federal requirements relating to financial planning.

C. PROCEDURES FOR DETERMINING REGIONAL TRANSPORTATION EMISSIONS

The federal conformity regulations set forth specific requirements for determining transportation emissions. A summary of these requirements and the procedures used for this plan amendment are summarized below:

1. Demographic, Employment and Transportation Demand

Specific sources of population, employment and traffic information used in the Transportation Plan have been listed above. Chapter 7 of the 2000 Transportation Plan presents conditions and characteristics of the existing regional transportation system.

Chapter 10 of the 2000 Transportation Plan discusses trends and changing demands that various components of the transportation system will serve in the future years. It discusses the future roles of the highways, transit, pedestrian and bicycle travel and water travel. It also describes the development and evaluation of alternative scenarios that were analyzed to help determine the final recommendations of the 2000 Transportation Plan.

Chapters 8 and 10 of the 2000 Transportation Plan outlines the specific project recommendations that are set forth in the Transportation Plan for the Pioneer Valley MPO Region through the year 2025. The recommended projects have been included in the regional transportation model networks for the analyses performed for the latest conformity determination of this transportation plan amendment.

Only regionally significant projects are required to be included in the regional modeling efforts. The final federal conformity regulations define regionally significant as follows:

> ***Regionally significant:*** a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sport complexes, etc., or transportation terminals as well as most terminals themselves) and would be included in the modeling of a metropolitan area's transportation network, including at a

minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel.

In addition specific projects have been exempt from regional modeling emissions analysis. The categories of projects include:

- Intersection channelization projects,
- Intersection signalization projects at individual intersections,
- Interchange reconfiguration projects,
- Changes in vertical and horizontal alignment,
- Truck size and weight inspection stations, and
- Bus terminals and transfer points.

The 1997 Conformity Amendments have allowed traffic signal synchronization projects to be exempt from conformity determinations prior to their funding, approval or implementation. However, once they are implemented, they must be included in determinations for future plans and TIPs.

The Networks are composed of projects proposed in the approved Transportation Improvement Programs, and the 2000 Transportation Plan. Projects in the Baseline networks consist of all in-place regionally significant and transportation demand management projects plus all projects where one of the following steps has occurred within the last three years:

- Comes from first year of the previously conforming TIP,
- Completed the NEPA process, or
- Currently under construction or are undergoing right-of-way acquisition.

A listing of the projects that meet these criteria and are included as part of the Baseline network is shown below. These projects include:

Palmer, intersection improvements at Route 20 and 181, Shearer's Corner
Chicopee, construction of a bridge over Chicopee River, connect with Route 41
Holyoke/South Hadley, construction of a bridge over Conn. River, Routes 116/141
Agawam, construction and relocation of Rte 57, East Phase
Springfield, construction of new bridge over Chicopee River
Holyoke, expansion of the Holyoke Mall and intersection improvements
West Springfield, widening and signalization of I-91 Exit 13 B
Springfield, State Street signal coordination

The 2003 Network includes all projects in the 1997 Baseline and all new TIP projects expected to be completed by the end of 2003. Those projects include the following:

Westfield, Route 20 traffic signal coordination
Chicopee, Route 33 traffic signal coordination
Amherst/Hadley, Route 9 traffic signal coordination
Springfield, Berkshire Avenue signal coordination

Holyoke/West Springfield, Rte 5 signal coordination
Hadley, widen Rte 9 to four lanes from West Street to Coolidge Bridge
Hadley/Northampton, rehabilitation of the Coolidge Bridge (lane addition)
Springfield, reverse the direction of four existing I-91 ramps
Springfield, Boston Road signal coordination

The 2010, 2020 and 2025 Action Networks include the following regionally significant projects:

Agawam, Rte 57 relocation from Rte 187 to Southwick town line
Holyoke, construct Elmwood Bypass, from Rte 391 to Lower Westfield Road
Holyoke, Commercial Street extension project
Springfield, Blunt Parkway Connector between Roosevelt Avenue and Bay Street
Westfield, Rte 10/202 bridge widening over Westfield River
Northampton, construct roadway from Old South Street to Route 66
Ludlow/Springfield, Route 21 Bridge reconstruction
Springfield, construct a new off ramp from I-291 to East Columbus Avenue
Agawam/Springfield, I-91/South End bridge improvements, elimination of Route 5/57 rotary
Springfield, improvements to Parker Street
Chester, Maple Street bridge
East Longmeadow rotary improvements

In addition to emissions calculated from the network model, a separate analysis was performed off-model to determine emissions from the installation of two Park and Ride lots, Express Bus Service along Route 9, an ITS monitoring project on Route 9, two Intermodal Transportation Centers in the Pioneer Valley region (One at Union Station in Springfield and one at UMass), and the 2001 CMAQ projects for the Pioneer Valley region.

2. Changes in Project Design Since the Last Conformity Determination Analysis

The Commonwealth requires that any changes in project design from the previous conformity determination for the region be identified. The last conformity determination was performed on the 1998 Amendment to the 1997 Transportation Plan. Changes which have occurred since this last conformity determination are as follows:

- Conformity must be performed using the newly submitted 2003 mobile source emission budget.
- Conformity must be performed using new emission factors submitted by DEP, which reflect the latest assumptions (i.e., progress of the I/M program, etc.).

3. Model Specific Information

40 CFR Part 93.111 of the federal regulations outlines requirements to be used in the network-based transportation demand models. These requirements include modeling methods and functional relationships to be used in accordance with acceptable professional practice and reasonable for purposes of emission estimation. The Pioneer Valley MPO has used the methods described in the conformity regulations in the analysis of this **2000 Pioneer Valley Regional Transportation Plan.**

4. Highway Performance Monitoring System Adjustments

As stated in guidance by EPA, all areas of serious ozone and carbon monoxide nonattainment must use the Federal Highway Administration's Highway Performance Monitoring System (HPMS) to track vehicle miles of travel (VMT) prior to attainment to ensure that the state is on line with commitments

made in reaching attainment of the ambient air quality standards by the required attainment dates. The Massachusetts Highway Department (MassHighway provides the HPMS information to DEP. DEP used this information in setting mobile source budgets for VOCs, NOx, and CO in all SIP revisions prior to 1997. DEP has since revised its VOC and NOx budgets using transportation demand model runs. However, the models must still be compared to HPMS data since HPMS is the accepted tracking procedure set forth by EPA.

The conformity regulations require that all model based VMT be compared with the HPMS VMT to ensure that the region is in line with VMT and emission projections made by DEP. An adjustment factor has been developed which compares the 1997 HPMS VMT to the 1997 transportation model VMT. This adjustment factor is then applied to all modeled VOC and NOx emissions for years 2003 through 2025 to ensure consistency with EPA accepted procedures.

$$\frac{\text{1997 HPMS VMT}}{\text{1997 Modeled VMT}} = \text{Adjustment Factor}$$

$$\frac{14{,}282{,}000}{12{,}706{,}351} = 1.124 \text{ Adjustment Factor for VOC and NOx}$$

5. The Conformity Test

a) Consistent with emission budgets set forth in SIP

The Pioneer Valley MPO has conducted an air quality analysis of the **2000 Pioneer Valley Regional Transportation Plan.** The purpose of the analysis is to evaluate the plan's air quality impacts on the State Implementation Plan (SIP). The analysis evaluates the change in ozone precursor (VOCs and NOx) emissions and carbon monoxide emissions due to implementation of the **2000 Pioneer Valley Regional Transportation Plan**. The modeling procedures and assumptions used in this air quality analysis follow the EPA's final conformity regulations issued on August 15, 1997. They are also consistent with procedures used by the Massachusetts Department of Environmental Protection to develop Massachusetts' 1990 Base Year Emission Inventory, 1996 Reasonable Further Progress Plan, the Post-1996 Reasonable Further Progress Plan, 1996 Rate of Progress Report, and the Ozone Attainment Demonstration for the SIP. All consultation procedures were followed to ensure that a complete analysis of the **2000 Pioneer Valley Regional Transportation Plan** was performed with consistency with the SIP.

The primary test to show conformity with the SIP is to show that the Air Quality Conformity of the **2000 Pioneer Valley Regional Transportation Plan** is consistent with the emission budgets set forth in the SIP. The Massachusetts Reasonable Further Progress Plan (RFP) has been deemed complete by the EPA in a letter dated June 5, 1997. EPA has made a determination that the 15% RFP SIP submittal contains an adequate mobile source emissions budget to conduct conformity determinations using the conformity criteria. In addition, EPA found the 2003 mobile source emission budget adequate for conformity purposes on February 19, 1999.

The VOC mobile source emission budget for 2003 for the Massachusetts Western Nonattainment Area has been set at 23.770 tons per summer day and the 2003 mobile source budget for NOx is 49.110 tons per summer day.

The total tons per day of VOCs and NOx for the Western Massachusetts nonattainment area from all of the analyzed scenarios are shown in Tables 1 - 3. The results of the air quality analysis demonstrates that the VOC and NOx emissions from all Action scenarios are less than the Western Massachusetts VOC and NOx emission budgets. In addition, the CO emissions for Springfield for all analysis years are less than base year 1990 emissions

Table 12-1 -VOC Emissions Estimates for the Pioneer Valley
(all emissions in tons per summer day)

Year	MPO Emissions	Action Emissions	Budget	Difference (Action -Budget)
1997	23.19			
2003	13.14		23.770	10.63
2010	11.48		23.770	12.29
2020	12.52		23.770	11.25
2025	14.29		23.770	9.48

Information for the Western Massachusetts Non-Attainment Area to be provided as it becomes available

Table 12-2 - NOx Emissions Estimates for the Pioneer Valley
(all emissions in tons per summer day)

Year	MPO Emissions	Action Emissions	Budget	Difference (Action - Budget)
1997				
2003	28.76		49.110	20.35
2010	27.12		49.110	21.99
2020	28.82		49.110	20.29
2025	30.99		49.110	18.12

Information for the Western Massachusetts Non-Attainment Area to be provided as it becomes available

Table 12-3 - CO Emissions Estimates for the Springfield CO Nonattainment Area
(all emissions in tons per summer day)

Year	Action Emissions	1990 Base	Difference (Action - Base)
1997	45.56	101.764	56.204
2003	26.87	101.764	74.894
2010	23.75	101.764	78.014
2020	23.42	101.764	78.344
2025	24.20	101.764	77.564

D. CONCLUSION

The Clean Air Act Amendments of 1990 established new requirements for transportation plans, programs, and projects. EPA published a final rule in the November 24, 1993 Federal Register which was last amended on August 15, 1997 providing procedures to be followed by the United States Department of Transportation in determining conformity of transportation plans, programs, and projects with the SIP.

The Pioneer Valley MPO has conducted an air quality analysis of the **2000 Pioneer Valley Regional Transportation Plan** and its latest conformity determination. The purpose of the analysis is to evaluate the plan amendment's air quality impacts on the SIP. The analysis evaluates the change in ozone precursor emissions (VOCs, and NOx) and CO emissions due to the implementation of the **2000 Pioneer Valley Regional Transportation Plan**. The modeling procedures and assumptions used in this air quality analysis follow EPA's and the Commonwealth's guidance and are consistent with the procedures used by the Massachusetts DEP to develop Massachusetts' 1990 Base Year Emissions Inventory, 1996 Reasonable Further Progress Plan, the Post-1996 Reasonable Further Progress Plan, 1996 Rate of Progress Report and the Ozone Attainment Demonstration for the SIP.

Western Massachusetts has been designated as a Serious ozone nonattainment area. The City of Springfield is designated as nonattainment for CO. Federal conformity regulations require that transportation plans, programs, and projects evaluate their impact on nonattainment areas. Western Massachusetts is made up of three regional planning agencies (RPAs), therefore VOC and NOx emissions must be combined in order to compare the results to the conformity criteria.

EPA has found the base year emissions inventories, the 15% Plan, the 9% Plan, and the contingency submittal administratively and technically complete in a letter dated June 5, 1997. In addition, EPA found the 2003 mobile source emission budget adequate for conformity purposes on February 19, 1999. This establishes the new mobile source emission budgets for which the new conformity determinations will be based. In addition, EPA has made a conditional interim approval of the Massachusetts 15% Rate of Progress Report and Contingency Plan in a letter dated June 18, 1997.

Accordingly, the EOTC has found the emission levels from the **2000 Pioneer Valley Regional Transportation Plan** in combination with the emission levels from the other RPAs in Western Massachusetts to be in conformance with the SIP according to conformity criteria. Specifically, the following conditions are met:

- The VOC emissions for the Action (build) scenarios are less than the 2003 VOC mobile source emission budget for analysis years 2003 through 2025.

- The NOx emissions for the Action (build) scenario are less than the 2003 NOx mobile source emission budget for analysis years 2003 through 2025.

- CO emissions for Springfield for all analysis years are less than base year 1990 emissions.

In accordance with Section 176(c)(4) of the Clean Air Act as amended in 1990, the MPO for the Pioneer Valley Region has completed its review and hereby certifies that the **2000 Pioneer Valley Regional Transportation Plan** and its **latest** conformity determination conditionally conforms with 40 CFR Part 93, and 310 CMR 60.03.